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Quotable

"Everyone agrees that if it had been able to come out a year earlier, it would have seemed more spectacular."

RICHARD CYERT
CARNEGIE MELLON
UNIVERSITY

*On the Next machine.
Story page 1.*

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Your spouse thinks it's all fun and games, but business travel is what business people most love to hate. A sampler of "hates" from a recent survey of 650 frequent-flier members of the American Productivity & Quality Center includes these quips: "Flights canceled for unbelievable reasons, like not enough sleep for crew, no pilot, other apparent lies." "Ants in my bed. No apologies from hotel. Sent a guy who looked like he was out of a horror movie to move me late at night." "Plane had a power failure that lasted several seconds. Screaming, yelling, food all over. Told us it was wind shear. Bull. It was a flameout, pure and simple."



'No thanks,
I'll walk,' say
many potential buyers
of the 486-based
PC. Page 81.



See Letters
Security Pacific Bank's Richard Herrel turned to a relational database and windows workstations in cleaning up a systems mishmash. Page 29

EXECUTIVE BRIEFING

■ The annual McCormack & Dodge users group conference opens today in San Francisco amid widespread skepticism about product support under the MSA-dominated management of D&B Software. D&B Software will try to allay those fears by announcing 24-hour hot-line support and an on-line bulletin board help desk. **Page 1.**

■ Movement in the IS executive ranks continues as Barry Kotar, president of United Airlines' computerized reservation system subsidiary Covia, hopped on board with competitor Northwest Airlines. Kotar fills the spot left vacant when William Sitter became Allstate's CIO last year. Separately, former Chrysler MIS Director G. Nichols Simonds became the new IS chief at Honeywell, and Dale Riordan was named to the top IS post at Fannie Mae. **Stories, pages 6, 132.**

■ IS executive pay is 9.4% higher than last year, according to a survey of 31 large corporations. However, top positions in systems planning, disaster recovery and database administration zoomed 25% or more. **Page 8.**

■ A Harris poll found that 79% of Americans are concerned about threats to their privacy in the computer age. A shocking 45% agreed with the statement that "technology has almost gotten out of control." **Page 4.**

■ DEC customers will see a wide range of technology advances in the next few years, DEC President Ken Olsen said in a *Computerworld* interview. RISC architecture will become more prevalent throughout the VAX product line, and Ultron will eventually blend with the Open Software Foundation's Unix version. However, the VAX 9000 will not ship in volume until late this summer, dimming Wall Street's hopes of a DEC financial rebound. **Page 1.**

■ Oil giant Sun R&M Co. decentralized its IS department last year with the intention of getting systems decisions closer to the business units. However, the move has reaped the added benefit of prompting IS managers to "first-class citizens" who participate in business unit budget and personnel decisions. **Page 71.**

■ A comprehensive study of the true costs and benefits of electronic data interchange has been launched by an auto industry IS group and Carnegie Mellon. Research-

ers will study the use of EDI at Chrysler, LTV, Texas Instruments and Southwestern Bell. **Page 6.**

■ The Next machine has not set the world on fire, despite the hype and hope of Next founder Steve Jobs. Next's lackluster sales prove once again that while being ahead-of-its-time technology can be a tough sell in the marketplace. **Stories, pages 1, 130 and 131.**

■ Equipment arbitrage is legal, and a manager at John Hancock's IS group says it offers a leading-edge technological strategy without financial bleeding. It means buying products at deep discounts or any way possible and selling them into the used-equipment market just before prices soften. **Page 122.**

■ On-site this week: Security Pacific's global trading centers on four continents will move to the client/server model, with DEC's RDB relational database as the anchor. **Page 29.**

■ Managing 500 local-area networks across the country isn't easy. Martin Marietta employs fast-packet multiplexer technology to do the job while cutting down on T1 lines. **Page 59.**

Veteran's Affairs Medical Center in Palo Alto, Calif., has brought in Alcatel-Monolithic from Silicon Valley neighbors Sun Microsystems to track and interpret patients' diagnostic data. **Page 45.**

The vaccinations that dreams are made of will depend on IBM Systems Network Architecture peer-to-peer connections at Minex's Cruiseline Information Systems, an electronic cruise booking service. **Page 60.**

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Consumers fear threat to privacy

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Because of a gut-level distrust of government, business and "uncontrolled technology," nearly four out of five U.S. consumers (79%) are concerned about threats to their privacy in the computer age, according to a Louis Harris and Associates, Inc. opinion poll released last week.

Harvey Taylor, president of the New York-based polling firm, said the national survey of 2,254 consumers "sends a strong warning signal" to companies that have databases of consumer information that assesses that fail to respond to consumer concerns about privacy may end up facing strict government regulation, he said.

Alan P. Westin, a Columbia University professor and academic adviser for the poll, attributed the results to the public's general distrust of large institutions and technology. The poll found that 45% of Americans agreed with the statement that "technology has almost gotten out of control."

The survey comes at a time when many consumers advocates are upset about the trend toward "database marketing," in which direct-marketing firms compile lifestyle databases and credit

profiles for highly targeted marketing campaigns [CW, May 14].

The poll found high levels of trust that hospitals, government agencies and employers will handle personal data in a responsible manner, but consumers put direct-marketing and credit-reporting firms at the bottom of

neatness as a fundamental right, the survey found.

The poll results may provide a boost for several legislative proposals — such as a bill creating a federal privacy oversight board and another one regulating Caller ID services — now getting attention in Congress, according

to privacy concerns. "The winners in industry will be those that listen and respond," said Bonnie Gulton, consumer adviser to President Bush.

Despite the strong concern about privacy, Westin said, U.S. consumers are also pragmatic. He said they are willing to divulge personal information if they believe it will be handled fairly and they will get some "bargain" in return.

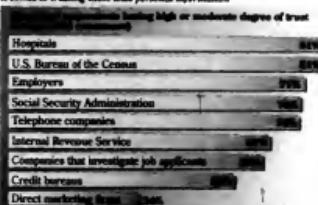
The poll found that 78% of the consumers admitted they would be upset if they could not obtain credit based upon their record of paying bills — an opportunity made possible by credit databases. "Consumers want it all. They want privacy, and they want the consumer society," Westin said.

The poll was commissioned by Atlanta-based Equifax, Inc., a provider of consumer financial data and a major player in the credit bureau industry. Taylor praised Equifax for its "gutty decision" to sponsor a poll likely to produce added publicity and to give House full control over the poll's content.

C. B. "Jack" Rogers Jr., president and chief executive officer of Equifax, explained that the company wants to take the "high road" on the privacy issue and is planning to capitalize on it this fall by introducing an unspecified service "designed to give consumers a more active role in direct marketing."

Who can be trusted with private data?

Direct marketing and credit-reporting firms rank lower than the IRS when it comes to trusting them with personal information



Source: Louis Harris and Associates, Inc.

CW Chart: Dennis Dolan

the list (see chart).

Seven out of 10 U.S. consumers (71%) feel they have lost all control over how personal information about them is circulated and used by business, while 79% believe privacy ranks with "life, liberty and the pursuit of happiness."

The survey comes at a time when many consumers advocates are upset about the trend toward "database marketing," in which direct-marketing firms compile

to Marc Rotenberg, spokesman for Computer Professionals for Social Responsibility.

Westin said the most progressive firms have adopted a code of "fair information practices" and formed consumer advisory boards to help management re-

tailor the bulletin board Help system that will be on display at the conference, is due to be available within 30 days, Donahue said.

"The most significant announcement we will be making is that we will be offering our customers a new service that will give them 24-hour support for production-down situations," Donahue said, explaining that a 24-hour hot line will be set up with consultants on call for emergency situations.

While D&B Software plans to focus immediately on users' concerns with support, the company will not be releasing any information about future product line directions until late August or September, Lindsey said in a recent phone interview.

"As far as what will happen with the product lines, I don't think we know yet. I don't think [D&B Software] knows yet. I think we'll just have to wait and see at this point," said Bonita Paynter, an M&D user and director of financial systems at KAT, Inc. in Glenview, Ill.

As for the company's stability throughout the merger, Lindsey said, sales are up by 25% this quarter, based on combined sales for the same quarter last year.

Bill McNeely, an analyst at Gartner Group, Inc.'s Software Management Strategies service,

said sales were up because of customers who had a "wait and see" attitude and have come off the fence this quarter to fulfill their back product demands.

However, he added that sales will probably stagnate after this quarter for a while until the company's next-generation product line comes out.

Indignity rakes

D&B Software has said that organizational changes are behind the newly merged firm, but bitterness lives on in the M&D employees who left.

Although the D&B Software severance program, called the Merger Action Plan, was officially completed on May 31, many former M&D employees are still upset about the severance process.

"They could have done this with much more dignity. Instead, they came into a department, called a meeting on a Thursday morning, and those who made it through the day would know they had their job for one more week," a former M&D employee said.

Another employee, who still works at the firm, said the Natick, Mass., office was virtually unaware that there were layoffs at Management Sciences America in Atlanta — the firm M&D merged with — until someone called a Natick employee after being laid off. "It would have helped if we had known what was going on, rather than being treated like numbers," the employee said.

Severance packages given to approximately 325 people worldwide, reducing the work force by about 10%, according to Ken Millen, director of human resources at D&B Software. "About 100 people were severed in Atlanta and 125 in Natick, as well as another 100 people worldwide," he said. The severance program cost D&B Software about \$10 million, Millen said.

"I think, in most cases, there are people in the company that are bitter, but when I look at what we've done in our area, inside and outside of our industry, I think we've done a good job," Millen said.

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NEWS SHORTS

Administration: Audit credit records
In response to consumer complaints about inaccuracies in credit bureau databases, Bonnie Guton, consumer adviser to President Bush, last week suggested the government audit a sampling of credit files for accuracy and publish the results annually. She told Congress that this approach — similar to the federal report card on airlines' on-time arrivals — would be an incentive for credit bureaus to improve their records for accuracy.

Fannie Mae names IS chief

The Federal National Mortgage Association last week named Dale P. Riedens as executive vice-president for operations and systems, with a mandate to fully integrate Fannie Mae's "business side with the company's information technology capacities." Riedens was previously head of marketing and has rotated through several other senior positions at the mortgage investment firm. He succeeds Samuel A. Alward, who will become technical adviser to the company president. The company said it converted records for six million loans from manual to computer systems under Alward's leadership.

Reach way out and touch someone
In an unprecedented acquisition, two regional Bell holding companies pooled their cash last week to purchase a foreign telephone company. Ameritech and Bell Atlantic Corp., along with two New Zealand investors, said they would purchase the state-owned Telecom Corp. in New Zealand for approximately \$2.4 billion. At the conclusion of the deal, Ameritech and Bell Atlantic will hold 24.95% of the New Zealand telephone company, which has 3.3 million subscribers.

E-mail directory debuts

3Com Corp. last week announced 3+ Open Directory, which it claimed is the first multivendor global naming directory for LAN Manager systems. Based on the still-incomplete CCITT X.500 electronic mail directory standard, the directory is said to provide users with a single repository for network names and addresses and to synchronize directory updates across the network. 3Com also announced 3+ Open Menum, which will allow users to access applications or information across networks not only from 3Com but also from Novell, Inc. and Banyan Systems, Inc. Both products are scheduled for delivery in the fall.

Sun signs up Mentor

A week after electronic design automation firm Mentor Graphics Corp. renewed its contract with Hewlett-Packard Co. for reselling its Apollo Division workstations, the firm signed a similar agreement with Sun Microsystems, Inc. Mentor's software, which had been installed only on the Apollo platform since 1981, will be on Sun-based products by the end of the year.

Stratus backs OSF standard

Stratus Computer, Inc. last week announced that it will support the Open Software Foundation's Distributed Computing Environment (DCE) software on both the proprietary VOS and FTX. Stratus' version of AT&T Unix System V, DCE is a proposed industry standard software technology for distributed applications shared by multiple vendors' networked computers. It is endorsed by IBM, Digital Equipment Corp., HP, Microsoft Corp. and other prominent vendors.

IBM strikes Kodak deal

IBM tapped into the publishing world last week through a joint venture with Eastman Kodak Co., owner of the Atex Publishing Systems unit. The two companies said that they plan to mount a standards-based publishing systems architecture to be used by magazines and newspapers throughout the world. IBM denied reports that it was taking an equity stake in Atex.

More news shorts on page 122

Northwest lands Covis CEO

BY ELLIS BOOKER
CWT STAFF

MINNEAPOLIS — Barry A. Kotar booked himself a one-way flight here last week, leaving his post as president and chief executive officer at Covis Corp. to join Northwest Airlines as its executive vice-president and chief information officer.

Kotar's arrival at Northwest comes as the long-drawn-out search for a new Northwest — the nation's fourth largest carrier — when top information systems executive William H. Sitter left the firm to join Allstate Insurance Co. as CIO and senior vice-president of information technology (CW, Oct. 23).

"Barry is the premier automation expert in the airline industry, and he is an important part of the executive team we have assembled over the last

several months," said Northwest Chairman Al Checchi in a prepared statement.

Kotar will oversee Northwest's entire computer and communications operation, including executive information service, telecommunications and systems development for computer applications in all of the airline's departments and divisions.

Kotar came to Rosemont, Ill.-based Covis in 1987 from United Airlines, which spun off its Apollo computerized reservation system operation as Covis in 1987.

Today, Covis is jointly owned by United and a group of domestic and foreign airlines.

During his 20-year tenure at United, Kotar held several management titles, including senior vice-president of MIS, vice-president of Apollo service and vice-president of customer services.

In another recent re- cent IS change at Northwest, Douglas J. Schwinn, senior director of information systems development, left the company late last month to join Hayward, Calif.-based department store chain Mer- vyn's as its director of systems and programming.

Covis Vice-President of Business Development Fred Blackney had been named acting president and CEO, according to a Covis spokesman.

card prices projected for 1994 to market in 1992 or 1993 by accelerating the volume of network interface card components, most of which remain the same for the FDDI and twisted-pair cards. He said that twisted-pair products could be available as early as nine months from now.

Chipcom and Synoptics intend to license their technologies to adapter card manufacturers, no acceptance by the FDDI standards committee is

OUR GOAL IS to bring the current \$11,000 FDDI per-node connection down by 50%."

STEPHEN DIAMOND
SYNOPTICS

(Type 1) cabling only, used mainly in IBM Cabling System installations. Chipcom has developed technologies for shielded and unshielded twisted pair.

Ries said that the 50-meter distance limitation could be a problem in older buildings because "you often don't even know where the wires go. Some may have wrapped cable around a chair leg on the way to the wiring closet."

Migration to the emerging FDDI standard has been slow because of the high costs associated with electro-optic components, which are shipping in low volume, and the installation of fiber cabling.

"Our goal is to bring the current \$11,000 FDDI per-node connection down by 50%," said Stephen Diamond, marketing manager at Synoptics. Fowler said Chipcom hopes to bring the \$2,000 to \$4,000 FDDI adapter

important for inspiring vendors to manufacture the cards.

The alternative-medium conceptual parallel efforts spearheaded by Synoptics involve a backbone, allowing 10M bit/sec. Ethernet networks to run over unshielded twisted pair instead of its standard medium, coaxial cable. To that end, technology developed by Synoptics, Digital Equipment Corp. and 3Com Corp. was integrated and developed into a separate standard — 10Base-T — which was completed earlier this year by an ANSI working group. According to Fowler, there are now four million Ethernet/twisted-pair nodes.

CORRECTIONS

Eight of the 13 scheduled speakers from IBM did in fact speak at the Comdex/Spring '90 show (CW, June 11).

Lotus steps up Unix effort with 80386 versions

BY PATRICIA KEEFE
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. dropped more of its multiplatform shoes onto the desktop last week, releasing four Unix editions of 1-2-3.

The Lotus spreadsheet will run under AT&T Unix System V, Release 3.2 on Intel Corp. 80386-based computers. The four editions of 1-2-3 are for Unix Systems V/386 offerings from AT&T and The Santa Cruz Operation (SCO), SCO's Xenix System V/386 and Interactive Systems Corp.'s Unix System V.

These platforms kick off Lotus' System V drive because of their combined installed base, which totals 400,000, and mature distribution channels.

Other than support for AT&T Unix System V, the newest additions to the Lo-

tus cross-platform strategy provide the same features as does 1-2-3 for Sun Microsystems, Inc., which shipped in April.

If these ports are successful, some analysts are expecting Lotus to offer a version for IBM's AIX. David Rome, Lotus' director of Unix products, said that Lotus will "investigate and support other versions of [Unix] as our users request it."

Lotus will also wait for Unix customers to indicate which graphical user interface needs to be supported.

In a separate announcement this week, Lotus plans to introduce an upgrade to the government edition of 1-2-3 Release 2.2. Key enhancements include a translation

module to support several brands of Unix spreadsheets, the ability to print wide reports on dot matrix printers and an electronic tutorial called Easy Start.

Lotus will also launch an electronic bulletin board in August that will provide federal customers with product updates and support.

Senior product manager Alan Menard said a government edition of the Microsoft Corp. Windows 3.0-compatible 1-2-3 Release 3.1 will be forthcoming about 30 days after its commercial release this fall. It will include the same enhancements, plus a Datasieve driver for the Microsoft/Sybase, Inc. SQL Server.

These introductions signal a renewed emphasis on the government market, where Lotus has found itself squeezed out of at least two major desktop contracts, either for not supporting Windows or PoS-compatibile Unix.

While most of the government's 1.6 million installed base of personal computers is Intel 80286-based or smaller, Tom Ruff, Lotus' director of federal systems marketing, said that 70% of government agency requests for proposals call for a 386-based Unix system.

Lotus is targeting 1-2-3 for AT&T Unix System V at multilayer installations. A single-user edition costs \$695, the multilayer edition supporting 10 nodes costs \$1,295, and more users may be added for \$495 each.

Oracle, users call support truce

BY JEAN S. BOZMAN
CW STAFF

REDWOOD CITY, Calif. — A one-day meeting between top Oracle Systems Corp. executives and leaders of regional user groups produced the desired result last week: a truce that reduced simmering tensions about pricing policies and product support.

"People were pretty skeptical going in. But what they said — and the way they said it — changed our minds," said Richard Goth, a consultant at Cap Gemini America, Inc., who represented the Midwest Oracle Users Group.

The meeting held near Oracle headquarters last Thursday was the start of what Oracle calls its Affinity program for users. "They want to develop a relationship in which the users are regarded as partners," explained Tony Ziembra, president of the New York Oracle Users Group. Efforts to obtain comment from Oracle executives were unsuccessful.

According to users, Oracle promised in a written statement to do the following: Disclose confidential corporate information to the Affinity program members; respond to the top five product enhancements requested by users; and provide free access to a technical-support bulletin board on Compuserve. Executives also promised to respond quickly to emergency product support questions and aim for a 48-hour turnaround time.

Top executives made confidential disclosures about Oracle's business and presented product plans and new support policies. However, they also demanded nondisclosure of confidential materials.

The Affinity program calls for quarterly meetings with the top user-group representatives, including a session at the September meeting of the International Oracle Users Group in Anaheim, Calif. Ziembra said the meetings stem from longstanding user pressure on Oracle executives to address product concerns.

"This user movement has come up from the grass roots," Ziembra said. "We can see that we're getting results, but we won't have a report card on the Affinity program until next year."

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Salaries of IS jobs skyrocket

BY ALAN J. RYAN
CW STAFF

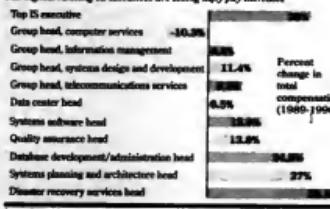
NEW YORK — Serious salary purveyors take note: Pay is on the rise in a big way for three information systems executive positions — systems planning and architecture chief, disaster recovery services chief and database development and administration chief.

According to a study of 31 major U.S. corporations conducted by Edward Perlis Associates, Inc., those three position experienced average total compensation increases of 25% more this year as compared with last year and had substantial increases in base compensation as well. The study also revealed that in all, the top 15 executives' total compensation climbed an average of 9.4%.

The executives responsible for systems planning and archi-

Top dollar

The highest ranking IS executives are seeing hefty pay increases



ture concentrate their efforts on taking advantage of advancing technology. The disaster recovery services heads concentrate on averting and minimizing the effects of system catastrophes. Also, the database devel-

opment and administration head is important as a focus for corporate efforts to make better use of the data in their systems.

John A. Putney Jr., executive vice-president at Teachers Insurance & Annuity Association

in New York, said the big decreases in pay scales for the three areas mentioned in the survey may not be an accurate reflection of what is happening at his organization.

For instance, Putney said, his firm's database development and administration positions have traditionally been on the high end of the pay scale, and he did not recall any major changes this year over last. He did say the importance of the disaster recovery function has evolved from a systems perspective to an overall company-wide perspective.

Roger O'Connor, a senior consultant at the management consulting firm, said the survey showed that compensation rates in the telecommunications area did not climb as rapidly during the latest survey period as they did in previous years ago. "The whole telecommunications field in terms of pay practices is starting to ease off a little," he said. "Salaries are not moving as aggressively as they used to three or four years ago."

Novell's 386 Netware goes for SAA

BY JIM NASH
CW STAFF

Novell, Inc., a Netware Communications Services is a belated question mark for some information systems administrators and analysts. Others see it as a firm step for Novell into the large company arena.

Introduced last week, Communication Services is a platform designed for Netware 386 Version 3.1 networks that will include long-awaited Netware Lomdale Modules. One of the modules, Services for SAA, will provide network-to-IBM mainframe connectivity over existing IBM Systems Network Architecture backbones.

Gerry Machi, marketing director for Novell's communications products, said that Services for SAA provides "all the connections" between local-area networks and IBM minicomputers and mainframes. The software is scheduled for delivery this fall. Several users, some of whom are Novell beta-test sites, had yet to hear about it.

For IS managers, the software provides centralized network management and security on Netware's 32-bit operating system.

Two versions of the Systems Application Architecture (SAA) product will, respectively, support up to 64 and 256 simultaneous sessions, while another combination of modules has been tested with a total of 1,000 concurrent sessions.

Communication Services' reception by users was muted last week. Midway Airlines did not see an immediate need for the product. Bob Thompson, a systems analyst at Midway, said, "Right now, we've set up our own link to the Sabre system" mainframe operated by American Airlines. The Chicago-based airline runs all of its flight-control software from Novell LANs through Memores Teles Corp. dedicated gateway PCs and to Sabre mainframes.

Frank Dusheck, president of the consulting firm Communications Network Architects, Inc. in Washington, D.C., played down the announcement's significance in LAN-to-mainframe settings.

Services for SAA, Dusheck said, "is in line with the other vendor's [communications] services." He and other analysts cited similar products held by IBM, Banyan Systems, Inc. and a joint product by Digital Communications Associates, Inc. and Microsoft Corp. Machi countered that Novell is the first to link 1,000 concurrent sessions.

OSI/Net Management protocols released

BY ELISABETH HOWITT
CW STAFF

NEW YORK — Some 100 computer and networking vendors met last week to release the first full set of network management protocols based on the Open Systems Interconnect (OSI) standard.

Some users with long-term OSI plans said they still see commercial, interoperable OSI-based network management

products as several years away. "There's a difference between having something on paper and having it in reality for us," said Tom Nakamura, product manager for engineering design networks at Hughes Aircraft Co., adding that the "interim, transition period will probably take a lot longer for them to start using those products as a foundation for multivendor network management."

The OSI/Network Management Forum announced Release 1 of a full set of specifications for both fault and configuration

management.

The forum fulfilled its goal of bringing out a working set of OSI management protocols well ahead of the official standards bodies, AT&T official William Gilbert said.

Hewlett-Packard Co., AT&T and MCI Communications Corp. were among the vendors that said they would comply with the standard sometime next year. However, users said that it would probably take a lot longer for them to start using those products as a foundation for multivendor network management.

"I think everyone agrees on the concept of standardized network management, but the reality here is a lot of devices that

don't talk the same protocol" to OSI specifications, said Keith Addison, manager of network integration at GTE Sealab.

"We can't have OSI network management until we could OSI networks, and that's still tough to do," Nakamura said.

Andrew Bach, director of communications engineering at Securities Industry Automation Corp., agreed that "seeing is believing" when it comes to standards-based interoperability. He added, however, that his company's Intel Corp. and Digital Equipment Corp. systems using the first four OSI layers "lived together almost at the first shot. We had to pick our jaws up off the floor."

Compaq to plug 386SX into laptop line

BY RICHARD PASTORE
CW STAFF

HOUSTON — Compaq Computer Corp. is scheduled today to reveal its first laptop computer based on Intel Corp.'s hot-selling 38386SX chip. Observers briefed by Compaq expressed disappointment that the chip will not debut in Compaq's popular LTE notebook family as well.

The new SLT is expected to include the IBM Video Graphics Array display and three-hour battery of its Intel 80286-based SLT predecessor. However, the model will be powered by the fastest SX processor on the market, will add 4M bytes of cache memory and will offer greater hard disk capacities (see chart).

Some SLT 286 users were unfazed by word of the SX version. "We're not constrained by the [286] technology at this point; I don't see it changing our

buying habits," said William Harbin, senior vice-president of The Hartford Insurance Group in Hartford, Conn.

"Our SLT is perfectly adequate at this time," added Eric Gibbons, manager of MIS at Unisys-Goodrich Tire Co. in Easton, Wis.

One user pushing the limits of his SLT 286 waits in Stephen Rood, a microcontroller manager at Comshare & Lyons Inc. in New York. "It would be something we'd take a look at," Rood said of the SX model. However, he expressed dismay at Compaq's pricing, saying that with a discount, he could buy the more powerful Toshiba Corp. 5200 laptop for about \$1,000 less.

Still, analysts said they expect the new SLT to do well. "It's going to be extremely competitive, and it will be just as popular as the SLT line has been in the past," said Will Fastic, editor of

"The Fastic Report," a Baltimore-based personal computer newsletter.

Still, some analysts had hoped for an SX-based LTE, Compaq's trend-setting seven-pound notebook computer. "That's the machine that would have made me jump up and down," Fastic said.

However, a Compaq spokeswoman said the firm has yet to find a way to deploy SX technology in the compact LTE. "The systems boards in the LTE are too small," she said. Some observers said Compaq should deliver an SX-based LTE in nine to 12 months.

Compaq is also scheduled to announce today availability of its first desktop unit using the 20-MHz 386SX. The box offers 4K bytes of cache, 23M bytes of memory and hard disk capacity options of 80M or 120M bytes. Prices range from \$3,299 to \$15,299.

Lap power
Compaq's latest laptop features the 20-MHz 386SX and hefty hard disk options

SLE 386SX/20
CPU: 20-MHz Intel 386SX
Weight: 14 pounds

Memory: 2M bytes, up to 14M bytes

Cache: 4K bytes

Storage: 80M or 120M-byte hard disk

Battery life: Three hours

Display: 10-in. monochrome VGA, backlit LCD display

Price: \$6,799 to \$7,499

Source: Compaq Computer Corp.
CW Chart: Mario Hahn

Closing Arguments

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NSFnet hits the high-speed links

By ELIZABETH HOWITT
CW STAFF

WASHINGTON, D.C. — NSFnet, the network supporting nationwide research collaboration, began linking researchers and supercomputer centers at 45M bit/sec. last week — 30 times its

previous speed, the National Science Foundation (NSF) announced.

Implementation of Phase 2 of the NSFnet project began on schedule, with six out of the network's 13 nodes due to migrate by year's end from 1.5M bit/sec. T1 links to 45M bit/sec. connec-

tions, the NSF said.

NSFnet is also gaining one T1 node and two T3 nodes by the end of the year, one of which will link to the New England Academic and Research Network, the NSF said. The foundation is allocating \$7.9 million to the expansion.

The other seven nodes are scheduled for upgrade next year, according to NSF director of networking Stephen Wolff.

To support the new speeds, IBM developed a new packet-switch architecture, and MCI Communications Corp. will supply 45M bit/sec. network service — neither of which are available commercially (see story below).

The jump from T1 to T3 speeds is a crucial one, given the network's explosive growth during the past year in terms of both the number of nodes and the volume of traffic it supports, Wolff said. Network traffic has grown to more than three billion packets per month, compared with about 125 million packets per month in July 1988, when the T1 network was deployed, he said.

The network will enable a "whole new range of applications" whose bandwidth requirements had restricted them to systems in the same computer center, said Michael Levine, co-scientific director of the Pittsburgh Supercomputing Center.

Projects such as global climate modeling involve the regular exchange of complex calculations and visual data among researchers and computers that are looking at different aspects of the problem, Levine said.

Right now, researchers typically collaborate on such projects by "sending a truck full of magnetic tapes," Levine said. "They want to bring turnaround time down from a matter of days to a matter of minutes."

This should begin to be possible with the 45M bit/sec. links and even more so with multi-gigabit/sec. connection for which research funding was recently allocated, Levine said (see story page 61).

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Switched off

IBM essentially had to junk the packet switch it had originally developed for the National Science Foundation and provide "a whole new generation of technology" to support 45M bit/sec. rates, said IBM executive Frank R. Moore.

NSFnet's old packet-switching nodes comprise multiple IBM RT workstations, each of which handles a single T1 link.

The new packet switch, with 50 times more throughput, is a single IBM Micro Channel Architecture (MCA)-based microcomputer, which can be either a RISC System/6000 or a Personal System/2 running AIX, and is equipped with multiple Busmaster cards.

Each MCA card controls either a 45M bit/sec. T3 link over MCI Communications Corp.'s network, or a 100M bit/sec. Fiber Distributed Data Interface link that allows the packet switch to act as an interface between NSFnet and an FDDI campus network.

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Racal-Interlan at end of its LAN Manager rope

BY JOANIE M. WEKLER
CW STAFF

BOXBORO, Mass. — Unable to see the light at the end of the LAN Manager tunnel, Racal-Interlan recently pulled the plug on products aimed at interconnecting Microsoft Corp.'s fledgling network operating system with Novell, Inc. Network local-area networks. The company also dismissed the 15% of its work force associated with the products.

The networking firm's LMN Server, which allows Netware clients to log on to LAN Manager 1.1 file servers, and a prototype product allowing the reverse pro-

cess have both been aborted, although they were rolled out only last February. "We had to make a cold, hard [return on investment] judgment here," explained Dave Tolwinski, Racal-Interlan's vice-president of marketing. "LAN Manager didn't develop as rapidly as we thought it would, and thus neither did the market for LAN Manager/Netware interoperability."

No commitment

"Everyone was delighted to hear we were developing the LAN Manager/Netware products, but no one was willing to commit to using them," he added.

Tolwinski explained that Racal-Interlan perceived structural changes in the market as inhibiting the takeoff of LAN Manager, which runs with Microsoft's OS/2 operating system. One change, he said, was Microsoft's recent decision to depart from its OEM-only distribution philosophy and sell LAN Manager directly.

"We think this will create additional confusion in the market and slow down LAN Manager sales," he said. Tolwinski also cited as a stumbling block Compaq Computer Corp.'s recent reversal of a decision made in February to resell LAN Manager.

Bob Nerz, Racal-Interlan's software product line director, added, "LAN Manager 2.0 [which takes advantage of Intel Corp.'s 80386-based computers] won't be shipping in high volume until 1991, sometimes a year behind schedule."

Nerz noted that the LAN Manager products may be licensed to another party and that negotiations are under way with vendors who might take over the products.

Suits charge phony MS-DOS

BY CHARLES VON SIMSON
CW STAFF

REDMOND, Wash. — Microsoft Corp. and Everex Systems, Inc. have filed civil charges against a group they claim introduced more than 30,000 counterfeit copies of MS-DOS into the U.S. market, the firms announced last week.

In a series of lawsuits, the first of which was filed under seal on April 6, 1990, the two companies jointly alleged that a total of 16 individuals and business entities in New Jersey and Northern California were engaged in the manufacture or sale of a counterfeit of the Microsoft MS-DOS product marketed by Everex under the trademark Parcorp.

"These lawsuits are part of a vigorous antitrust campaign by Microsoft," said William Neary, the firm's vice-president of legal and corporate affairs. In addition to pursuing civil suits, the two firms said they will make any evidence gathered available to the U.S. Attorney and the FBI for possible criminal investigation.

The process began in late March when Everex officers learned that a stand-alone version of Parcorp was being sold in some retail outlets. The company does not sell a stand-alone version of the software.

After Everex consulted with Microsoft, the suits were filed and seizure orders were issued to confiscate merchandise from six locations in New Jersey and California between April 10 and May 8.

Business records and more than 1,000 units of allegedly counterfeit products were seized. Several thousand additional units of product and promotional artwork were subsequently turned over by four of the defendants in response to an order issued by U.S. District Court Judge Charles A. Legge.

"We have an extremely strong case and at the moment intend to prosecute all defendants to the full extent of the law," said Debra Vogt, Microsoft senior paralegal.

Persons named as defendants are Joe Fox of San Jose, Calif.; Benny S. Lee, Norman Chan and Susan Chan of Fremont, Calif.; Thomas Wu, Michael Wu and Frank Ho of Edison, N.J.; and Tai Yen Chu, Robert Young and Christi Liang, corporate officers of San Jose, Calif.-based Asia Source, Inc. None of the defendants could be reached for comment.

Because Everex does not sell a stand-alone version of Parcorp, any versions of the product lacking an Everex system are likely to be counterfeit, the companies said. The allegedly bogus product looks very similar to the authentic version but lacks a bar-code or date-code sticker on the package, according to Everex.

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Candle offers status monitor for VTAM

BY JEAN S. BOZMAN
CP STAFF

LOS ANGELES — Candle Corp., which makes its \$130 million in annual revenue selling performance monitors for IBM systems facilities, announced last week that it had tapped a new market: IBM's VTAM network management software.

The new product, *Console*, for VTAM, applies Candle's monitoring technology to VTAM, a subsystem of IBM's MVS mainframe operating system. In time, Candle intends to consolidate its performance packages for IBM CICS,

IMS, DB2, VM and VTAM on a single systems console, Candle Chief Executive Officer Aubrey Chernick said.

"The status monitor is our hub," Chernick said. "It will pull together all our products so that an enterprise-wide network can be managed from one place."

Testing tool

Console for VTAM is, in effect, a tuning package, product manager Marc Ann Armstrong said. It analyzes raw performance statistics, which are automatically collected by VTAM, and displays the results so that system memory can be real-

located to reduce system bottlenecks.

"Before this, we had no tools that would give us that information," said Wali Abdellah, senior systems programmer at Home Savings of America F.A. in Irwindale, Calif., which has been beta-testing the product for two months.

"Now we can tell how much memory VTAM is using for its buffers and which application is using the most," he said. The Home Savings branch operation uses VTAM on two IBM 3090 machines to communicate with other regional offices.

Industry analysts said VTAM, which is nearly 20 years old, has acted as a "black

hole" that allowed some applications to drain system resources. However, network managers — even those trained by IBM in tuning techniques — often cannot identify resource-hungry applications without a lengthy system trace.

"IBM gives you the tools to tune VTAM, but they don't give you the VTAM performance statistics you need to do the job," said Bill Strapo, senior software analyst at International Data Corp. in Framingham, Mass.

Among the new package's major features is a corporate analysis module, which sends alerts if network traffic exceeds preset levels.

There is also a hot-key to IBM's Network view manager, so operators can simultaneously monitor VTAM response times and Netview system alerts. Console displays show a variety of parameters on color-coded screens, along with windows and pull-down menus. Among the parameters displayed are tuning statistics, response-time analysis and buffer-pool status.

CGI steers CASE toward networks

BY ROSEMARY HAMILTON
CP STAFF

BOSTON — CGI Systems, Inc. took its first step away from the mainframe last week with the introduction of a local-area network-based computer-aided software engineering package.

At the same time, the software company reiterated its commitment to IBM's AD/Cycle and said it will eventually migrate users to IBM's repository from the CGI one.

One early user, who had been running CGI's mainframe-based package called Pegasus, said Pagan allowed him to off-load development from the host system and make the tools more available to users.

"It brings the tools closer to the developer," said Francois deBeck, director of systems development at the Department of Communications for the Canadian government. "I've seen a difference in attitude of my staff. We are doing a better job than we used to do before because the environment is separate from the mainframe."

CGI will target users who want better response times or don't want to compete for mainframe resources or wish to keep development separate from other processing, company officials said. However, a user can also license a Pegasus version that hooks into the host-based system.

The stand-alone version would run on an IBM OS/2-based server and support both IBM Personal Computer and Personal System/2 workstations.

Unlike some other vendors, CGI is not positioning its products as AD/Cycle alternatives. Instead, it calls these products a preliminary step and said it will eventually help users migrate to the IBM repository.

The plan is to make CGI's repository consistent with the IBM plan, which would make the migration smoother, said Dick Ramsdell, chief executive officer. Once users make the move to the IBM repository, they can continue using the CGI tools.

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solutions based on your needs, not only our technology. Solutions that add value to something you already have wherever possible, be it IBM, UNIX, Wang VS or whatever.

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But unlike anyone else, we know the only way we win, is if you win.

LET'S GET TO WORK.

WANG

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ADVANCED TECHNOLOGY

TECH TALK

Windows on work

Computer users who spend their time peering into a graphical user interface generally are more productive, less frustrated and use more features of their software, according to a study sponsored by Zenith Data Systems and Microsoft Corp. The two companies set out to compare character-based and graphical user interfaces by observing both novice and experienced users. The results of the study indicated that graphical user interfaces users work faster, complete tasks more accurately and experience less fatigue, among other benefits. chalk it all up to the "navigation theory," which holds that the intuitive icons and menus embodied by graphical user interfaces promote use, exploration and retention of functions in one or more applications — making users more productive and confident, the companies claimed.

Big word for a chip

Toshiba America Electronic Components Inc. recently introduced what it claimed is the industry's first 1M-bit dynamic random-access memory (DRAM) with a 16-bit word width. The new 64K by 16 device is ideal for personal computer and laptop graphics applications, allowing designers to reduce component counts from eight to two and increase reliability, according to Ayo Kanjanaporn, DRAM product marketing manager at Toshiba. The devices are available in byte-wide and write-per-bit versions with 80- or 100-nsec access times. Low-power versions are also available, Toshiba said.

They see it coming

Imaging business will grow explosively in the early 1990s, according to the Association for Information and Image Management. Industry revenue is expected to climb from \$3.3 billion in 1988 to \$12.7 billion by 1993. It projects that more than half of the 1993 revenue, about \$6.88 billion, will be electronic imaging.

Is a wedded PC-TV in your future?

Despite hubbub, some call HDTV overrated and see PC-TV hybrid as the next wave

BY MICHAEL ALEXANDER
CNET STAFF

Much has been made of high-definition television (HDTV), the technology that promises to bring 35mm film-like pictures and compact-disc fidelity to home TV viewers. But when HDTV finally debuts in the U.S., the technology will be too late, and in its place will be the "telecomputer," a hybrid television set and personal computer, said several experts who believe that HDTV is much ado about nothing.

"Today's computer already has higher image quality than today's TV set," said William Weily, an analyst at Volex & Co., a San Francisco investment firm. "TVs and computers are different in only one regard: Bit mapping allows computers to control an image, while today's TV sets merely display an image." The processing power required to control an image is substantial, and it is in this area that we believe major strides are being made that will blur our mental paradigm of the two medium."

The many supporters of HDTV, which include a consortium made up of IBM, Apple Computer, Inc., Hewlett-Packard Co. and several other computer companies, have promoted HDTV as the cornerstone in a new generation of computer and consumer electronics products.

"HDTV is more than just another pretty TV picture," a report on HDTV released by the U.S. Office of Technology Assessment concluded last week. The development of commercial HDTV is linked to several information-age technologies, including digital processing of real-time video; high-performance displays; fast, high-density magnetic and optical data storage; technologies for packaging and interconnecting integrated circuits; and more.

Many experts and they think HDTV's potential technological and economic impact has been exaggerated. The television set of the future will be more like a PC, complete with a PC's expandability, memory and peripheral. Researchers at MIT's famed Media Laboratory in Cambridge, Mass., have been promoting such an "open-architecture TV" for several years, for example.

HDTV is already obsolete because it is based on analog technology developed more than 50 years ago, MIT's researchers and others have argued. The future is in all-digital interactive TV, with which home and office directors will be able to reshape video images any way they wish, rather than merely passively sitting by as couch

potatoes, they said.

"HDTV is a digression," said Gloria Davenport, assistant professor of media technology at MIT's Media Lab. At a recent conference on digital multimedia, Davenport said users will have a computer-television capable of scaling and reconfiguring images and taking disparate video bits called "motion picture icons" and linking them in a browser, much in the same way that an Apple Macintosh user might create programs with Apple's Hypercard.

Among the early business applications for a telecomputer will be video electronic mail, messages delivered by talking heads via local-area networks, said Martin Duhms, president of New Media Graphics in Billerica, Mass.

years away, the future of HDTV, at least in the U.S., is no longer as bright as the pictures the technology is capable of delivering.

"HDTV has gotten enormous negative press," said Lawrence Kaplan, vice-president and general manager of the visual systems group at Tektronix, Inc. "There is an incredible lack of understanding: people think that it is for watching *Home on the Range* at home. I have grave concerns for our future."

In April, the Defense Advanced Research Projects Agency (DARPA) announced that much of the \$30 million that it had earmarked for HDTV research had been diverted to other projects. The same month, Craig Fields, DARPA's deputy director and a staunch supporter of HDTV, resigned under pressure from the Bush administration.

Love for an important date
The Federal Communications Commission has said it will not select an HDTV standard until the spring of 1993. However, a group of U.S. broadcasters called the Advanced Television Testing Center that banded together last year to test HDTV equipment has repeatedly postponed the start of testing, thus making it unlikely that the FCC will be able to stick to its timetable.

HDTV systems aim to sharpen TV pictures by at least doubling the number of scanning lines that make up TV images. In Japan and the U.S., TV pictures are composed of 525 scanning lines, and those in Europe are made up of 625. HDTV would put as many as 1,250 lines on-screen.

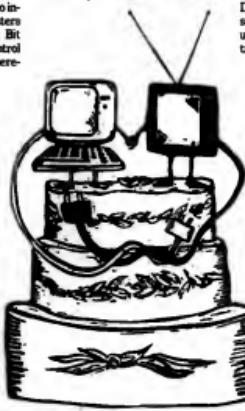
The FCC has already ruled that an HDTV system must be compatible with television sets already in use and stay within the 6-MHz band that TV channels now use.

TO GET AROUND THE LIMITATIONS IMPOSED BY THE FCC, SEVERAL COMPANIES ARE PROPOSING HDTV SYSTEMS THAT

WILL SIMULTANEOUSLY BROADCAST HDTV signals along with ordinary signals, using channels that would be kept vacant for the purpose. Viewers with HDTV sets would tune to those channels to watch HDTV broadcasts.

To squeeze the 30-MHz signal bandwidth of an HDTV signal into the 6-MHz band, HDTV advocates are planning to digitize at least part of the signal and compress it before broadcasting.

The FCC's compromise solution will ultimately favor tomorrow's interactive TV, Weily said. Once the signal has been digitized, it could be viewed and manipulated on a television-computer.



Halftone

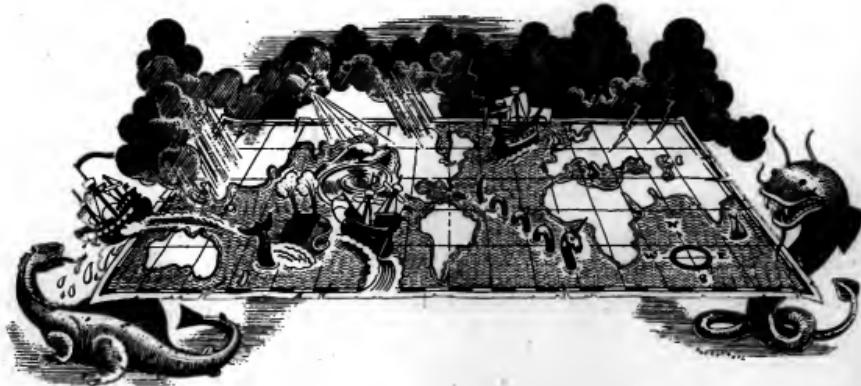
"If you want higher resolution, there are many ways to skin the cat," Duhms said. "HDTV is the brute force way, where you double or triple the number of pixels on-screen. Another way is to process images so that low resolution looks better."

Digitalizing a National Television Standards Committee signal, the TV standard used in the U.S. and Japan, and displaying it in real time on an IBM Video Graphics Array monitor would offer a considerable improvement over today's ordinary TV sets, Duhms explained.

Applications such as video E-mail, videoconferencing and video phones, with the PC as the platform, will begin appearing on the market within two years, Duhms added: "HDTV is a sideshow that is probably many years further away."

Though the telecomputer is still

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EDITORIAL

Easy does it

THE COMING OF AGE for any industry trend seems to be when a market researcher declares it to be a potential \$10 billion market. Outsourcing is the latest phenomenon to reach that milestone. One market research firm has already pegged 1994 as the year when users will contract out their data processing operations to third parties to the tune of \$10 billion. Of course, forecasters in the past have put forth similar glowing outlooks for videotex, home computing, compact disc/read-only memory and other underachievers.

We don't mean to belittle optimistic predictions or say that outsourcing won't be a major trend, but the issue needs to be put in perspective. Clearly, outsourcing has become a mandatory consideration for users looking to cut their information systems costs. When such Fortune 100 companies as Eastman Kodak and H.J. Heinz Co. contract out significant parts of their IS infrastructure, everyone takes notice. The benefits of outsourcing are apparent: lower fixed costs, easier management and the leverage to play competing vendors against one another. More IS executives are also coming around to the view that saving money for their firm is better for their careers than building a big department. Warner-Lambert IS chief Tom Hippie boasts that his firm is making its IS staff more competitive by encouraging users to solicit project bids from external and internal sources.

But the outsourcing decision is not a no-brainer, and its full implications haven't yet been felt. Several large companies have made major outsourcing commitments in the last two years, but some of those firms have been in deep financial trouble, and cost considerations have played a huge part in their decision.

Users who have taken the plunge also say that cost is among the *least* important issues to consider. The tough nuts are deciding which parts of your operation can be farmed out; who's responsible for integrity, security and liability; and how much control the user firm should expect to maintain.

There are also significant business factors working against outsourcing at this point. We now accept as gospel that businesses must decentralize and distribute to keep pace with rapidly changing markets in the 1990s. We take for granted that more control over information is moving to the user's desktop. Finally, the evidence indicates that data is becoming a corporate strategic asset rivaling in importance the actual goods the company produces. How prepared are you to hand that kind of treasure over to someone else for safekeeping?

It's easy to think of the computer room as a utility not unlike the air conditioning or the telephone. We suggest it should be treated more like the factory floor — a life-sustaining function that must constantly be improved to maintain competitive position. The future of outsourcing will hold its share of horror stories as well as successes. While waiting for the dust to settle, don't be too hasty to hitch your wagon to this star.



LETTERS TO THE EDITOR

The code truth

Your article, "For better and worse" [CW, May 7] reported that Ada programming projects showed productivity rates ranging from nine to 11 statements per day. In the same paragraph, you reported that Fortran projects experience a productivity of 14 statements per day.

Readers were not given a basis for comparing these figures. As we all know, a system coded in Ada might require more statements than the same system coded in Fortran. To make a comparison of coding costs, one must adjust for this size factor, as well as for differing productivity rates. As no comparative size factor was given, readers could easily have incorrectly concluded that a 100,000-statement Fortran system would have been a 100,000-statement system had it been coded in Ada.

Comparing it might have been the two languages APL and assembly rather than Fortran and Ada.

Tom Dey
Linton Computer Services
Mountain View, Calif.

More than SNA

We read with interest your story, "Codes link 9800 to Netview" [CW, April 2], about the new Codes 9800 Integrated Network Management System, which features an interface to IBM's Netview network management system. IBM's open network management strategy encourages companies to develop products that help our customers in this way.

We do wish to emphasize that IBM's Netview/PC product also provides solutions for customers who wish to connect non-Sys-

tems Network Architecture devices to Netview. Independent software developers have given Netview/PC strong support, as shown by the more than 40 products that currently interface to it, many running with OS/2.

Michael F. O'Brien
Director, Telecommunications
Systems Marketing
U.S. Marketing & Services
IBM
White Plains, N.Y.

Inconclusive?

Your Product Spotlight on front-end computer-aided software engineering [CW, April 9] explored many critical issues to consider in purchasing a CASE product. However, as a consultant experienced in user research, and one who also provided input for the article, I am concerned with both the methods used in gathering the information and the analysis of the results.

Although the results of this survey were largely inconclusive, the headline and article depict KnowledgeGuard as the clear overall winner. In such a subjective study, differences of even 1.5 may not be conclusive. This is particularly true of a survey that provides 10 choices for each category, making differences between ratings of 6.0 or 7.0, for example, largely inconsequential.

Furthermore, the survey does not provide a clear picture of who responded to the questionnaire. At CASE Associates, we have defined six categories of information systems organizations, and through my experience with both CASE vendors and potential customers, I have found that IS organizational structures dictate product selec-

tion criteria. Therefore, it is difficult to draw gross conclusions from the survey without knowing who responded.

The survey also showed that the respondents, on average, are using CASE for only 47% of their new development work. Perhaps the survey should have identified which firms use CASE for 100% of their new development work. They clearly would be more knowledgeable and committed to CASE technology.

Dave Skorn
President
CASE Associates, Inc.
Oregan City, Ore.

Early birds

Your article, "NCR has pricey pay-off in Micro Channel 486 box" [CW, May 28], noted that "NCR may recently jumped into the 80486-based computer market . . ."

Actually, NCR entered the 486 market in November 1989, when we were the first vendor to ship a 25-MHz 486 Micro Channel-based system. Two weeks ago, we were once again early to market, with three 486-based products: a 33-MHz server and desktop, and a technology upgrade.

Gary Horning
Assistant Vice-President,
Workstation Products Division
NCR
Dayton, Ohio

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Lohr, Editor, Computerworld, P.O. Box 9171, 375 Columbia Road, Framingham, Mass. 01701. Fax: (508) 875-8891; MCI Mail: COMPUTER-WORLD.

Missing links to unlikely merger

JEFF ANGUS

The evanescence of the near-complete merger of Lotus Development and Novell is one of those *Thirtysomething* fast-slow relationships. When the dominant networking operating system provider agreed to join the still-leading business software company, it looked great to them. But it looked like a kinky come to the computer industry and financial analysts who couldn't understand how a merger could benefit either firm. This almost-merger is worth discussing, not to rehash what's been said, but what was missed.

Why the merger? This merger could have been the key-stones of Lotus' goal of rehabilitating itself. Lotus' strength has rested on one product: 1-2-3. It has taken the revenue this cash cow has generated and invested it in other products, ranging from the visionary (*Agenda*) to the despicable (*Manuscript*). In Lotus' area of strength — large corporate customers — its cash cow is highly saturated, giving it smaller opportunities for growth than it would like. So how do you get into markets with lower total saturation and higher growth?

Through Novell, the dominant provider of accounting and

Angus is a manager at Farallon Computing, Inc., a manufacturer of Macintosh networking hardware and software in Berkeley, Calif.

networking solutions to small- and medium-size companies, a merger partner could have access to the most successful pool of value-added resellers (VAR) in the business.

Novell dealers have access to the smaller sites, are used to selling a technologically complex product and are used to the chronic support requirements that most networks require. Novell's VAR network would get Lotus into a market it never mastered, with a lot of room for growth. So, what was in it for Novell? That firm's ongoing tag-of-war with Microsoft for control of the microcomputer networking arena has given Novell a healthy appreciation for the power of technological advantage in that part of the market.

What Novell has Lotus bringing to the partnership was a visionary approach to microcomputer applications. In short, Lotus was a good conduit to a sharp marketing vision of the future — the blending of Lotus' application savvy with Novell's system savvy.

So the merger made some good sense, but probably not enough to justify it, why?

Mergers don't usually make sense. Mergers don't usually make business more productive. As organizations grow bigger and more diverse, it becomes harder to maintain the special light they followed as smaller concerns. It becomes

harder to render creative ideas and change directions.

Donald Clafford and Richard Cavanaugh, in their book *The Winning Performance*, discuss factors that help companies thrive in changing environments. One of the key factors is the sense that the enterprise is special in what it stands for, what



Mike Connolly

it does, and how it does it.

That unity of purpose becomes diffuse as companies combine and try to resolve their cultural and personality differences. Compromise does not work well in culture. It's confusing to the employees, managers and analysts, and more importantly, to the customers.

Mergers also make companies bigger, and that destroys innovation and competitiveness. Every decade, the U.S. Depart-

ment of Commerce does a study on the most important inventions in the last 10 years. The results are always the same: Small business is responsible for three-quarters of the significant innovations. Big companies don't produce innovations because that isn't what they're created for.

If you like a free enterprise, you've got to hate mergers on principle. If you work in the information industry, you've got to hate mergers because they

have invested massive amounts of their self-image in the companies they run.

Certainly, for the reasons discussed above, it was in Mass' interest to make this happen for Lotus shareholders. In the end, he seemed compromised with Novell when his own strategy would have been diminished in the deal. Novell apparently made initial pricing decisions on the transaction without consulting other large shareholders. Did he figure they'd follow him no matter what he did, or did he just not care? Either way, it was an act of pure ego, unfettered by concern for the firm or its shareholders.

When Novell went back to the table to regain points he'd already given away, he violated a cardinal rule of negotiation, terminating the opportunity. If executives can't get their neurotic ego problems out of business, our economy suffers.

Who wins, who loses? The evaporation of this merger explains one of the interesting rules of capitalist societies. Mergers usually force customers to pay more for less innovative product, as larger companies can dominate a market and force its will. This works in industries, such as computers, where distribution systems force out smaller players.

However, while revenue goes up for the merged mutant, the economy as a whole suffers as the giant wastes resources and loses opportunities to number, more creative, competitors overseas.

stand in the way of progress while raising the prices you pay for goods and services.

A failure of nerve. The Lotus/Novell merger failed, not because of the long-term profitability of the arrangement, but for the reasons most U.S. businesses are struggling in the world economy — pinheaded ego battles and short-term gains. The two principals, Lotus' Jim Manzi and Novell's Ray Noorda, are a pair of giant egos who, I suspect,

several problems.

First, in any dispute, there are two sides to the story. It is not necessarily the case that the vendor is wrong or other obligation pays. It is only the case that the vendor's denial of it does. The customer's denial of it may have equal legitimacy, depending on the facts of the case.

The problem here is that the vendor has set itself up as judge, jury and, most importantly, executioner, and has denied the customer its right to protest, to present its arguments to a legitimate forum, to negotiate a settlement or to do any of the other things we all have a right to expect in this country.

Secondly, the potential harm to the customer caused by the sudden disappearance of its system may have repercussions far in excess of the amount in dispute. Imagine an airline or a ticketing service getting shut down over a \$5,000 bill.

Finally, the bomb is a surprise that was not part of the original agreement. Thus, the customer had no opportunity to decline to enter into the contract in the

first place, which it might have done if it knew the risk it faced. The customer's only recourse when a dispute is in process is to seek injunction or prevent the bomb from being triggered.

Fortunately, there is precedent for this. In 1988, Frank & Sons, Inc., a trucking concern in Oklahoma, sought an injunction to prevent Information Solutions, Inc. from triggering a bomb when Frank & Sons with held payment pending repair of some bags. The court granted the injunction and rejected appeals by the software developer for the following reasons:

• The bomb was not disclosed to the customer before the contract was signed. The extraordinary nature of the device made this contrary to public policy.

• Frank & Sons was able to show that it would suffer irreparable harm if the bomb were triggered.

• The harm to the customer would be out of proportion to the harm to the developer. All the software firm would lose is some bargaining leverage (the injunction has nothing to do with its

ability to pursue the claim). The trucking company would suffer substantial real damage before there was any proof that it had even done anything wrong.

• Finally, there was a good likelihood that Frank & Sons would prevail in its contention that it did not yet owe the vendor the final payment.

What if a vendor actually initiates a bomb? According to Ron Johnston, co-editor-in-chief of "The Computer Lawyer" and a partner at Blanc, Gilbarone, Williams & Johnston in Los Angeles: "The bomb could backfire and result not only in punitive damages against the vendor but criminal sanctions as well."

What if the customer is told about the bomb prior to entering into the deal? The threat of such a sword of Damocles amounts to extortion, which strips the customer of any bargaining leverage and is therefore sufficient grounds to reject the contract and the entire deal, if necessary. Furthermore, it is not a bad idea to include a contract provision whereby the vendor states that no such device exists.

Pay up, or bombs away

LEE GREENFIELD

Imagine the obvious plan: You sign a contract with a builder for a new house. After it is completed and you move in, you discover that the plumbing leaks, the tile is cracking and half the windows won't open.

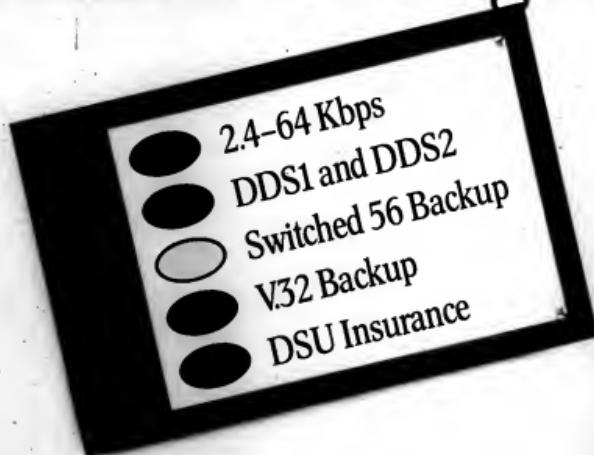
You decide to withhold final payment until these deficiencies are corrected. The builder does not agree with this and informs you that he has built a stick of dynamite into one of the structural members which, when detonated, will reduce your dwelling to toothpicks. This will clearly have a profound effect not only on the house but on your ability to conduct your life normally.

Weak defense

While at first blush this technique might seem a legitimate vehicle for the developer to reclaim property not paid for, it has

Greenfield, a management consulting partner in the Los Angeles office of Deloitte & Touche, specializes in computer-related legal matters, including contracting and litigation.

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SYSTEMS & SOFTWARE

HARD TALK
J.A. Savage

Place your bets



Like the opening bet in stud poker, Hitachi Data Systems' recent announcement of its top-end mainframe has only the first card showing.

The fact of the announcement, not necessarily its details, is the important news here. It opens the latest round of high-stakes marketing poker between HDS, Amdahl and IBM. In this game, users hold house odds.

The actual delivery of HDS' mainframe is supposed to be a year away. Before then, IBM is supposed to announce a step toward its "Summit" computer, which some analysts have called the J Prime, or perhaps even the long-awaited Summit itself this fall. Amdahl is also on its way to an announcement, as soon as it can finish testing.

HDS entered the game with a decent bet — a four-processor system capable of 150 million instructions per second (MIPS), which everyone believes is set to go eight-way as soon as the company feels it. It will have a few other nifty features, beating IBM with fiber-optic channels and offering support for

Continued on page 34

Massive speculation

Cray banking on parallel processing, but whose?

ANALYSIS

BY ELLIS BOOKER
CW STAFF

MINNEAPOLIS — Massively parallel computing, for years part of Cray Research, Inc.'s long-range research and development efforts, is now firmly part of the vision for the products Cray plans for the end of the decade. The question is: Will Cray build its own parallel processor, or will it acquire one?

Cray's current top-of-the-line computer, the Y-MP/8, uses eight processors; a 16-processor machine, with 10 times the performance of the existing line, is planned for delivery in 1992. A follow-on to the Y-MP/16, with a peak performance of more than 100G floating-point operations per second (FLOPS) and 64 or more processors, is in the planning stages for a 1994 target date, according to Cray sources. Cray has stated that it wants to have a one-trillion-FLOPS machine by the end of the decade.

In parallel systems, hundreds — or even thousands — of relatively simple processors attack a computational problem. Software has been a stumbling block to the approach, however. Parallel systems require computer code that is "parallelized," broken into pieces and parcelled out to the individual processors. Other issues include how to optimize the work of each processor, how to manage communications between processors and how to handle data dependency in paral-

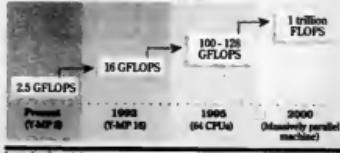
lel environments, where the solution to one problem is dependent on the answer to a previously solved problem.

At Cray's annual meeting last month, for example, Cray officials stated the firm's intention to reach a one-trillion-FLOPS machine by the end of the decade but acknowledged that reaching that goal will require a new computing architecture.

"Our view is that [massively parallel] systems are a form of special processors, and we're looking at a strategy to tightly couple these to a general-purpose processor," said Lester T.

Parallel tracks

Cray Research acknowledges that the growth path from its current Y-MP family requires massively parallel technology



CW Chart: Charles Deller

Davis, executive vice-president at Cray's Chippewa Falls, Wis., center for engineering and development, during an interview with *Computerworld*.

Davis added that it would be "a long struggle" for massively parallel systems to replace general-purpose machines. He also

said Cray had spent the past year examining the massively parallel approaches of other vendors.

While Cray executives continue to argue that existing massively parallel systems are best

Continued on page 36

Software AG touts option to AD/Cycle

BY ROSEMARY HAMILTON
CW STAFF

Software AG of North America, Inc. is launching an IBM AD/Cycle alternative this month with the general release of Predict CASE, an integrated set of software tools with a repository-based engine.

"The message is, yes, AD/Cycle is the correct approach, but [with Predict CASE] you don't have to wait," said Peter Page, an executive vice-president at Software AG.

Predict CYCLE is IBM's application development architecture that will rely on many third-party tools and a host-based repository, which runs on DB2. The repository will hold information about the application develop-

ment process.

IBM has also stated that AD/Cycle, introduced in late 1989, will take years to implement, and the integration between the repository and development tools will not exist until next year. The initial version of Repository Manager is scheduled for release this month.

Ready for work

Software AG, on the other hand, claimed to have a more complete product that users could put to work faster. The software will work with either Solaris, AG's relational database management system, Adabas, or IBM's DB2. The company plans to make it compatible with IBM's AD/Cycle as those product specifications become more clear, ac-

cording to Page.

Predict CASE relies on existing Software AG tools such as Natural, a fourth-generation language environment. The database engine is built into the Predict CASE package, which is a key difference from the IBM offering. With AD/Cycle, users are required to buy Repository Manager and DB2.

Page said the repository component, which he called a development database, provides the entity-relationship guidelines for application development. Currently, the company is developing two data models, which will reside in the repository. These models can be customized at client sites but will contain up to 80% of the information a customer would need, Page said.

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DEC cites printer cost, functionality

Digital Equipment Corp. recently introduced the Deciser 2000 line of desktop laser printers as a lower-cost, higher-function replacement for the LN03 line of printers.

Slated to be available next month, the Deciser 2100 printers are priced from \$2,399 and the Deciser 2200s from \$3,599 when bought in quantity or with a Decstation personal computer, workstation or VAX system. DEC is billing the new printers as inexpensive enough for personal use but sturdy enough for a shared office environment.

DEC IS billing the new printers as inexpensive enough for personal use.

The Deciser 2000 line includes the simplex Deciser 2100 for one-sided printing and the simplex/duplex Deciser 2200 for printing both sides. Each produces up to eight page/min. with a resolution of 300 by 300 dot/in., and each supports multiple paper sizes.

To enhance their use with PCs, DEC will offer an optional protocol cartridge that enables either model to emulate the Canon, Inc. brand of laser printers, which is supported by a large number of PC software applications. Additional software enables users to emulate the Hewlett-Packard Co. LaserJet series of printers as well.

MARYFRAN JOHNSON

Security Pacific's new strategy

The relational database is becoming its cornerstone for global trading

ON SITE

BY JEAN S. BOYMAN
CW STAFF

LOS ANGELES — Security Pacific Corp. is making relational database technology the centerpiece of its global trading activities.

The bank, the fifth-largest bank holding company in the U.S. with \$84 billion in assets, is loading relational databases in its major trading centers — New York, Los Angeles, Tokyo, London, Sydney and Frankfurt — with transaction data and presenting "slices" of that data on hundreds of MS-DOS-based workstations.

This is all part of an emerging client/server strategy, said Richard J. Harmel, first vice-president of facilities and technology at Security Pacific's Merchant Bank operation.

There is a drive to standardize on a relational database — in this case, Digital Equipment Corp.'s RDB — a DEC VAX. Moving toward standards is a way to homogenize what Harmel said was once "an agglomeration of VAX and IBM VM/CMS applications stuck together with bubble gum and baling wire."

About 14 months ago, Harmel and his staff of 12 software developers embarked on a migration toward a more standard environment — one that will eventually migrate all trading data to the RDB databases. Hundreds of users access these databases daily, collectively trading about \$12 billion per day in 40 currencies. In February, the first phase of this RDB-centered environment went into production. A second phase of the project is expected to add an RDB-based

real-time trading environment by next month.

If achieved, a centralized repository of data would give Security Pacific's trading systems an edge against competitive banks, Harmel said. "Ultimately, I would see many applications going against the same database, as the real-time components of our trading environment come together," he said. "We're [actively] discussing now how soon such a thing could be done."

The advantage of using relational technology, Harmel said, is that it allows transaction data to be accessed for pattern analysis and ad hoc queries. For now, older database systems that use hierarchical, indexed or flat-file database structures hold much of the trading information.

Until there is a single system, the bank will have to display information from separated databases on decentralized workstations. "A lot of processing is taking place at the workstations," Harmel said. "A relational database environment gives us the foundation to begin with, but we'll still need filters [at the workstation] to turn all that data into useful information."

One source of nonrelational data is a real-time transaction monitoring system that takes a global "snapshot" of all the bank's trading positions. Multiple IBM System/36 machines are used in overseas sites, while Security Pacific Automation Corp.'s IBM mainframes handle most of Security Pacific's back-office order processing.

However, there are links between these dissimilar systems, systems developer Carol Swart explained. One system can dial up many others, allowing Tokyo traders to access Los Angeles

sites, for example. The Money Market II VAX-based system, which uses a proprietary database to store data about U.S. Treasury bill issues, updates RDB nightly, Swart said.

As trading proceeds, RDB updates can be posted through the Trading Room Inquiry and Capture System, a VAX subsystem. This VAX "process" under VMS taps into the Money Market II data, then combines it with RDB data.

The round-the-clock nature

relies, Security Pacific Automation. The cost of running the computers, however, is absorbed by business units such as global trading. "Security Pacific is doing everything in its power to make itself run more efficiently," Harmel said.

Security Pacific's drive toward standards has gone much further on the desktop than with the bank's database servers. The new "client" workstation, Rapid Access Display and Information Utility System — known as RADIUS — is being offered to traders as one way to sort through the daily crush of numerical data.

RADIUS is based on industry standards, such as MS-DOS and

Harmel
Security Pacific's Harmel is taking firm to a standard RDBMS

of global trading is crowding out the traditional overnight scheduling for batch updates. "We're expending a lot of energy keeping the databases in sync," Harmel said. "For us, the day begins in Sydney, Australia, and ends in Los Angeles [at 3 p.m.]".

Harmel's computing resource — several dozen VAX machines scattered around the world — is operated and maintained by the bank's information systems unit.

Intel Corp. 80386 processors, to give traders freedom of choice in purchasing spreadsheets and to save on application development costs. "The traders and the dealers [in our operation] are computer-literate, so they know what analytic programs they want to use in their work," Harmel said. "I'm providing them with a spreadsheet environment and maintaining the overall information resource."

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SOFT NOTES

IBM to market social service systems

IBM and Transfirst Corp. signed a deal to jointly market systems for social services such as Aid to Families with Dependent Children and food stamp and unemployment insurance programs.

The two will sell the Trans-

first Accept electronic benefits transfer system to both government and health-care agencies. It provides automated benefit processing that eliminates some of the costs of manually processing and mailing forms and checks. The marketing effort is

scheduled to run for four years.

IBM Canada Ltd. and Aion Corp. teamed up to sell Aion expert system tools in Canada. IBM will solicit orders while Aion continues direct sales efforts. The Aion products run on

mainframes and IBM Personal Computers.

Ross Systems, Inc., Comshare, Inc. and Price Waterhouse recently formed a trio to sell Ross Systems' product with executive reporting capabilities. Ross will provide the application software and Comshare will contribute its Commander executive information system.

Once Commander is integrated with the Ross applications, Price Waterhouse will provide implementation and consulting services. Ross sells financial management, human resources and distribution software for the Digital Equipment Corp. VAX line of computers.

Boeing Co. recently licensed DMR Group, Inc.'s Productivity Plus, a system development methodology that will be used to create and maintain systems by Boeing's Application Systems Technology group. Productivity Plus includes guidelines, software and training.

HP ties minis to IBM nets

BY JEAN S. BOZMAN
CHI STAFF

CUPERTINO, Calif. — Hewlett-Packard Co. recently sought to make it easier for its HP 3000 minicomputer users to tie into IBM networks and for new users to get into the HP 3000 line with a plug-and-play system.

HP announced a new release of its proprietary MPE/XL operating system that will give HP 3000 computers greater connectivity with IBM's Systems Network Architecture (SNA).

HP MPE/XL Version 2.1 allows customers to build one backbone network to accommodate X.25 and SNA communications. Among Version 2.1's improvements is the ability for HP systems to trigger network alerts for IBM's Netview.

"We replaced the bottom three layers of our OSI [protocol] stack with SNA transport layers," explained Olivier Helleboid, a product marketing manager at HP's Information Networks Division. "Customers now have the option of running HP-to-HP communications over their X.25 network, or HP-to-IBM communications, or both."

The new low-end system, the HP 3000 Series 920, is intended to speed installation of the system at office sites. "The operating system is preloaded at the factory, and all the peripherals are already installed," HP 920 product manager Sridhar Ramamathan said. "We have an HP technician check the power source and plug the system into a wall outlet." The system is available now for shipment.

The HP 920 unit supports 20 users but can be upgraded four times to become an HP 3000 Model 932, which can support more than 64 users. A \$28,000 system includes main memory of 24M bytes, a 670M-byte hard disk drive, a 1.3G-byte Scsi Ltd. digital-audio tape backup unit, and HP's Allbase/SQL relational database management system.

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PRE-RELEASE

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CONTINUED FROM PAGE 25

24,000 peripherals.

While Amdahl flat-out denies it and IBM simply won't comment, both companies are expected to accelerate the time frame for their announcements, like card players nervously reshuffling their hands, because of HDS' play. They may also feel pressure to hedge their bets by adding (or letting out) more features and better pricing.

Check this out: The new HDS systems, not cheap at \$14.4 million for the top performer, still beat IBM's list price on machines with less growth potential and fewer features by more than 20% in

price per MIPS. According to Gartner Group, Inc. in Stamford, Conn., an IBM 3090 costs \$116,000 per MIPS, while the new HDS EX 410 will be \$96,000 per MIPS.

That is one reason users hold house odds in the marketing game. While Amdahl and HDS always try to start list prices well below IBM, list is just a starting point, and it can only decline from there. HDS has set theirs reasonably.

Also, IBM and Amdahl may be forced to ante up more features. For instance, although current HDS users would have to swap boxes, the investment in memory and channels can be retained instead of going through a new purchase. In the past, Amdahl has reluctantly offered a trade-in option for upgrades. With this on

the table, IBM may be forced to make the same concession.

Mark Hess at Gartner Group claims HDS is holding back, that there are several features within the computer that HDS hasn't "turned on" yet.

If the marketing betting gets hot and heavy, IBM and Amdahl may one-up HDS with features, and HDS could retaliate by unleashing a few more of its own while still making the promised shipment date. Users would benefit by having more features up front, instead of having them doled out when the company needs a kicker for their losses.

The companies might even use the marketing game to bring their machines out more quickly than they would otherwise, although this scenario is less likely

for everyone except HDS.

HDS' parent company, Hitachi Ltd., said it would deliver the same box to the domestic Japanese market with a proprietary operating system this fall. HDS should be able to roll out its machine soon after, since the only technology it adds is IBM compatibility.

Amdahl is probably rushing its machine as fast as it can. IBM has been burned before when it shipped processors and disk drives before they were proven. With the J Prime expected, users might be mollified until the Summit is ready.

While HDS' announcement may cause the usually ho-hum mainframe makers to do a little song and dance for the benefit of potential customers, HDS itself may get limited market share advantage — at least for the first year.

Its current high-end users number between 45 and 50 worldwide, according to the company. That means there are few users ripe for the new machines, and there will be a constraint on supply from Hitachi.

Jim Casselli, also with Gartner Group, estimates sales between 10 and 15 in 1991. At the same time, IBM ships in the thousands.

HDS is a patient company. It was almost humble on announcement day, eschewing dry ice and laser shows for food and decoration. It is going for the long haul and is expecting to grow incrementally, not take the market by storm.

In that respect, patience may be aided by HDS' relationship with parent. Hitachi puts up almost all the money for research and development. Hitachi takes the risk, and all HDS does is buy the box from them and add compatibility.

Amdahl, which has been griping for over a year about not being able to make much money on its high-end machines, puts more money into hardware design and takes the risk on development.

Storage is a Computerworld West Coast senior correspondent.



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Storage Tek's family expands

Storage Technology Corp. recently fine-tuned its tape library system with a new release of its host software as well as a new software package that adds automated functions to the tape management process.

The 4400 Automated Cartridge System is a tape storage and retrieval system that relies on robotics and software to manage a tape library.

The latest release of the Host Software Component will provide an interface from the operating system to the 4400, the company said. It will also support the company's Improved Cartridge Recording Capability.

The Expert Library Manager software package provides improved automation for such tape handling functions as scratch, slot and removal.

The host software is slated to be available later this month with an initial license fee of \$13,500. Expert Library Manager is scheduled to be released in August with an initial license fee of \$6,000, the company said.

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IBM

See OS/2 in action at PC Expo, June 19-21.

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Cray

FROM PAGE 25

for "niche" applications, they have recently suggested that the addition of such a system as a subsystem to Cray's own mainframe might be feasible.

"They could get in by acquiring a [parallel processing] company . . . I imagine there are quite a few who would welcome such a move," said Omer Serlin, editor of the "Serial Report on Parallel Processing," a monthly newsletter based in Los Altos, Calif.

Possibly foreshadowing an acquisition strategy was Cray's entry into the minicomputer market earlier this year. In March, it signed an agreement in principle to acquire Supertek Computers, Inc., the maker of a computer system compatible with Cray's now-discontinued X-MP product line. Cray has said it will port its Unix operating system, Unicos, to the Supertek SL-1 and that a Y-MP-compatible machine is in the wings for the second half of 1991.

However, Patricia Laupheimer, vice-president of research at Shearson Lehman Hutton, Inc. in New York, said she does not believe Cray will need to go outside to get the hardware for a mainframe line.

"I don't see why Cray can't do that as well as anybody else," she said, adding that she would not be surprised if the company turned to others to help it with the software side of the project. "I would be surprised to see Cray fall behind in general-purpose supercomputing — which is to say that when the technology is ripe, Cray will be there," Laupheimer concluded.

"I personally don't believe you can get to [teraflop] levels without massive parallelism . . . over 100 processors," said David Micciche, vice-president of marketing at BBN Advanced Computers, a division of BBN Communications Corp. in Cambridge, Mass.

BBN Advanced Computers announced its current machine, the TC2000, in July 1985 and to date has installed a total of 13 machines worldwide — ten in the U.S., two in Japan and one in Europe. The company's largest sale to date was a \$4.5 million, 126-processor system to Lawrence Livermore National Laboratory in Livermore, Calif.

In April, BBN underwent a 300-person staff cut across its operating units and repeated its statement from the beginning of the year that it was seeking "strategic alternatives" and additional investments.

Asked if BBN was talking with Cray about such strategic relationships, Micciche had no comment. A Cray spokesman confirmed that talks with BBN have occurred but said that they had been concluded.

However, achieving a 1-trillion FLOPS supercomputer — the Holy Grail of the high-performance computing industry — may be problematic, even with a massive parallel architecture.

According to a study presented by IBM last November, even massively parallel systems based on existing technologies will have trouble reaching the 1-trillion FLOPS objective. The analysis predicted that it would take 2,566 NEC Technologies Inc. SX/2 processors, 7,376 Cray Y-MPs or more than 24,000 IBM 3990 S-class mainframes to reach a 1-trillion FLOPS rating.

ECC returns to start for system rebuilding

ON SITEBY MAURA J. HARRINGTON
CNET

ATLANTA — It's not often that information systems managers have the opportunity — or challenge — to rebuild their systems from the ground up.

When Kneess was given the opportunity to decide how ECC America, Inc., a division of English China Clays International, would be replacing its IBM-based system, he jumped at the chance to make some changes.

"We're in a unique situation in that we're starting [over] from scratch. . . . I think the opportunity is positive," Kneess said.

Kneess and his superiors at ECC America had decided to get rid of the two IBM System/34s and one System/36 that had been used for 10 years and replace them all with a new Digital Equipment Corp.-based platform. However, just when Kneess thought everything was under control, ECC America acquired Georgia Kaolin, Inc., which runs its operations on three IBM System/36s, Kneess said.

In justifying the move to DEC, Kneess said, the bottom line was software. The IBM Application System/400 hardware that ECC America would have upgraded to "backs the versatility of the DEC VAX environment that we felt was needed" for the

software systems, Kneess added.

The VAX environment will include a VAX 6310 at each of the two production locations and a Microvax 3400 at a third production site, as well as another Microvax 3400 at ECC America's corporate headquarters in Atlanta.

The VAXes, which are located in Georgia, Alabama and Texas, will then be hooked together through a Decnet wide-area net-

 **ECC**
International

work. In addition, there will be a Novell, Inc. local-area network hooked up to each respective VAX via a gateway at each location, Kneess said.

The new system was scheduled for completion by the end of 1991, but the acquisition of Union, NJ-based Georgia Kaolin, which came about after the system choice, pushed the date of completion back by at least a year.

Like ECC America, Georgia Kaolin is a mining company with operations in Georgia that process the mineral Kaolin — a fine, powdery substance that is used to manufacture a glossy material, which is in turn used to manufacture magazine paper, glossy paint, ceramics and more,

according to Kneess.

"The merger will double our size from a revenue standpoint. From a systems standpoint, they are currently on three System/36s, and the strategy is to initially bring them into our new systems as quickly as we can," Kneess said.

Chosen challenge

While Kneess claimed that a DEC platform is his platform of choice for running the systems and applications software chosen, finding out about the Georgia Kaolin acquisition halfway through integration has made his job more challenging. However, Kneess said, he is still happy with his choice, and integration of the IBM systems will not interfere too much with his plans to finish getting the new DEC platform up and running.

"This [acquisition] obviously puts the pressure on us to move quickly," Kneess said. "But eventually, the conversion will be made by bringing our business software into our Ross Financials package, so we can convert their system onto the DEC platform."

Although he does not know where the two systems will be completely merged, Kneess said that he hopes to keep the Georgia Kaolin project separate from the VAX project as long as possible.

"We hope the software integration will be completed within a year. Eventually, we will convert their system to DEC, too," Kneess said.

"I guess this is an example of what makes life so interesting," he added.

HARD BITS

Concurrent ports security

Concurrent Computer Corp., has signed an agreement with AT&T to port its System V/MLS multilevel security system to RTU. Concurrent is a Unix-based operating system. Tinton Falls, N.J.-based Concurrent said it expects to offer the combined multilevel security operating system by February 1991 for its 6000 and 8000 series computers.

Data General Corp., will be porting AT&T's LAN Manager/X software to its Unix-based Avion line of workstations and servers. The licensing agreement with AT&T allows DG to offer LAN Manager/X customers a Unix-based software development platform and a range of applications built on DG's client/server Avion architecture.

The DG version of LAN Manager/X will be introduced by the end of this year, according to the company.

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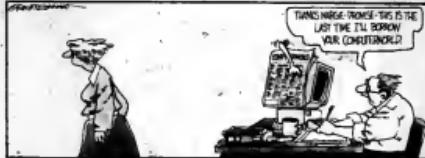
UK mail to run Nonstop

The British post office recently chose the UK subsidiary of Tandem Computers, Inc. to supply its first system for automating over-the-counter services for 21,500 post offices. The Thames Valley Project will initially link 250 post offices, banks and motor vehicle license centers to a central Tandem quadiprocessor Nonstop VLX system. The British post office averages 2,000 trans./day, from selling stamps to taking large cash deposits for the National Girobank.

Maspar Computer Corp., has announced the first European use of its massively parallel computer system, the MP-1, to the University of Bergen in Norway. Introduced in the U.S. in January, the MP-1 will be used in the university's department of informatics, a parallel processing laboratory.

Ferguson Enterprises, Inc., the nation's largest supplier of plumbing, heating and industrial supplies, has purchased a \$5.8 million fault-tolerant Sequioa Systems, Inc. Series 300 computer to automate its multilocation distribution business. The system, which Ferguson said will be the largest it has ever installed, will support more than 2,000 simultaneous users.

Israel Aircraft Industries (IAI) and Digital Equipment Corp., have announced a \$25 million joint development venture to integrate IAI's computer-aided design, manufacturing and engineering functions over the next five years. IAI has agreed to buy hundreds of Decstation and Vaxstation machines plus software and services. The aircraft firm will also participate in DEC's aerospace integrated management system programs, along with General Dynamics Corp.'s Convair Division.



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- Communications Systems
- Local Area Networks
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- Manufacturing/Computers/Computer-Related
- System Integrators/Value/Computer Services
- Computer/Peripherals/Software/Computer Services
- Computer/Peripherals/Design/Overseas
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- Dir. Mktg. Sales Promotions Admin. Svcs. Data Comm.
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- Svcs./Programming Software Dev.
- Svcs./Programming Software Dev.
- Svcs./Programming Software Dev.
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- Pres. Exec. Vice Pres. Pres. Pres.
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- Sales & Mktg. Manager Sales & Mktg. Mgr.
- Sales & Mktg. Manager Sales & Mktg. Mgr.
- Auditor Lawyer Accounting Mgr.
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COMPUTER INVENTORY (Circle one)

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- Workstation
- Microcomputer/Small Business Computers
- Mainframe
- Communications Systems
- Local Area Networks
- No Computer involvement

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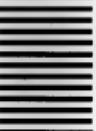
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SYSTEMS & SOFTWARE

NEW AT DEXPO EAST

The following products, services and new technologies will be announced at the Dexpo East exhibition in Boston on June 26-28.

Utilities

Integrated Software Design, Inc. will feature its On-Tap/VMS bar-code labeling and printing software package.

The product enables users to add bar-code printing capabilities to application software by placing a mark at any spot in a document where a bar code should be printed. Users can also create files with bar codes and send them to a local printer, print queue or remote printer in a network, according to the vendor.

On-Tap costs between \$1,995 and \$4,995, depending on type of Digital Equipment Corp. VAX configuration.

Integrated Software
171 Forbes Blvd.
Mansfield, Mass. 02048
508-339-4928

Computer-aided software engineering

Synthesis Computer Technologies, Inc. will unveil an integrated computer-aided software engineering application development system designed for the Digital Equipment Corp. VAX/VMS environment.

Caseshop is based on an advanced Cobol code generator. It enables users to define and create initial prototypes and refine them through an iterative process until a final application is completed.

Pricing ranges from \$5,000 for a Vaxstation configuration to \$75,000 for installation on high-end VAX systems.

Synthesis Computer
5199 E. Pacific Coast
Highway

Long Beach, Calif. 90804
213-494-4069

Applications packages

Total Tec Systems, Inc. will introduce an intelligent method of managing and using textual data and manufacturers.

The Nets natural English language text search system is based on a key concept search engine in which a user interface allows English questions and commands to be processed against textual databases.

The system runs on an Intel Corp. 30386-based associate processor networked to a Digital Equipment Corp. VAX machine.

Pricing begins at \$50,000.

Total Tec Systems
2 Gourmet Lane
Union, N.J. 08837
201-906-6500

CompuShare, Inc. will announce an addition to its Order Entry/Inventory Control series.

Kits, a single-level bill of materials processor, was designed for use by wholesale distributors

and manufacturers.

The product runs on Digital

Equipment Corp. VAX/VMS

systems and is priced from

\$25,000 to \$50,000, depending

on type of CPU.

CompuShare

1214 65th St.

Lubbock, Texas 79424

800-356-6568

Expressway
Jamaica, N.Y. 11418
718-297-5500

Data storage

Ranco Software, Inc. will introduce two tape management systems for Digital Equipment Corp. VAX/VMS systems.

Tapecontrol was designed to monitor and manage the activity of magnetic tape storage on VAX/VMS computers. The command-line driven system includes menu-driven interfaces to facilitate data retrieval and tape library management. The product costs between \$2,350 and \$19,500, depending on VAX configuration.

Tapeconvert facilitates the conversion of tapes between VAX (ASCII) and IBM (EBCDIC) or other foreign tapes. Pricing ranges from \$2,150 to \$5,150, depending on VAX configuration.

Ranco
2440 Research Blvd.
Rockville, Md. 20850
301-258-2620

NEW PRODUCTS—SOFTWARE

System software

IBS Corp. has announced Version 3.0 of its Quick-Talk Conference for help desks and training automation.

The software package provides help desk personnel with a nondisruptive, instantaneous method to capture, track and analyze data pertaining to on-line problems or pass it on to second-line support staff. The package also includes all necessary tools for performing live application training without disrupting the environment, the vendor said.

Release 3.0 is available for IBM MVS and ES/AS installations. Pricing for perpetual licenses or leases varies from \$12,500 to \$19,000.

IBS
4660 La Jolla Village Drive
San Diego, Calif. 92122
619-452-6045

Database management systems

At the International DB2 User's Group meeting last month, Most Software International announced enhancements to its Nomad DB2 interface.

The product now supports static access to DB2, thereby enabling Nomad applications to be generated and bound. The interface features an integrated computer-aided software engineering tool that generates the creation of Nomad applications that provide static DB2 access.

The enhanced interface is slated to be available in the fourth quarter for \$3,500 to \$21,500, depending on CPU size.

Most Software
4th Floor
101 Merritt 7
Norwalk, Conn. 06858
203-845-5000

Applications packages

Computations, Inc. has developed the Commitment Management System, a mainframe software package designed to help life insurance companies manage their commitment requirements.

The on-line, real-time system provides complete document review and approval procedures; comprehensive controls for reclaims, disbursements and accounting of fees incurred during the commitment process; a cash-forecasting facility; a general ledger interface; and text and

tickler notification capabilities. Pricing ranges from \$50,000 to \$75,000, depending on portfolio size used.

Computations
2500 Windy Ridge Pkwy.
Marietta, Ga. 30067
404-952-7854

Cincom Systems, Inc. has announced Release 7.0 of its Control Manufacturing package.

The product includes a standardized user interface, and its manufacturing modules feature screens that were redesigned using design standards derived after the Common User Access standards for character-based terminals.

Pricing ranges from \$80,000 to \$100,000, depending on type of Digital Equipment Corp. VAX/VMS or IBM MVS/VSE environment.

Cincom
2300 Montana Ave.
Cincinnati, Ohio 45211
513-663-2300

System Support Products, Inc. has announced Release 3.0 of Deskworks, an interactive spreadsheet program designed for users of IBM's Application System/400.

The upgraded software package stores spreadsheets as compressed files and includes two new commands: PRTPSR (Print Spreadsheet) and CLCSPR (Calculate Spreadsheet). These commands can be used in interactive or batch jobs to print or calculate spreadsheet edit sessions.

The product is available for a one-time license fee of \$95 for all AS/400 models.

System Support Products
7620 Ariens St.
Arlington, Va. 22003
703-642-2760

NEW PRODUCTS—HARDWARE

Turnkey systems

Concurrent Computer Corp. has announced Release 2.0 of its Topswitch electronic funds transfer, automated teller machine (ATM) and point-of-sale (POS) processing system.

The product incorporates hardware and application software that can reportedly drive from 10 to 10,000 ATM or POS devices, depending on the configuration used. Topalert software automatically calls a predetermined phone number if a problem occurs.

A basic system that can drive 24 ATMs at 2.5 real-time ATM trans/sec. is priced at \$250,000.

Concurrent Computer
106 Apple St.
Tinton Falls, N.J. 07724
201-758-7000

Processors

Harris Corp.'s Computer Systems Division has announced the Night Hawk 4400, a multiprocessor real-time computer system based on reduced-instruction-set computing (RISC) technology.

The system includes four Motorola, Inc. 88100 RISC processors on one board to provide processing of 80 million instructions per second. Motorola's Hypermode CPU packaging provides the Night Hawk 4400 with M88000 RISC architecture in clusters that include one, two or four 88100 processors.

The product is stated to be available in the fourth quarter from \$58,500 to \$93,500, de-

pending on configuration.

Harris
2101 W. Cypress Creek Rd.
 Ft. Lauderdale, Fla. 33309
305-973-5125

I/O devices

Carroll Touch, Inc. has announced a scanning infrared touch input system for the NEC MultiSync XL color monitor.

The add-on product includes an infrared touch frame with an on-board controller and a wall-mount power supply. The company's line of infrared touch systems are based on an optoelectric sensor that encompasses the computer display.

It is being sold in quantities of 100 for \$713 apiece.

Carroll Touch
P.O. Box 1309
811 Paloma Drive
Round Rock, Texas 78664
512-244-3500

Distributed Logic Corp. has announced a disk controller that enables users of Digital Equipment Corp. Microvacs to add multiple SMD/SMD-E Winchester disk drives to their systems.

The Model DQ3256 handles up to four drives with transfer rates up to 3M bytes/sec. It is compatible with the DU drivers in VMS and Unix operating systems. Features include dynamic transfer segmentation, which facilitates data reads in multiple drive subsystems.

The product is available at a list price of \$2,495.

Dialog
1555 S. Siebold St.
Anaheim, Calif. 92806
714-937-5700

Cybra Corp. has announced a user support tool for application software developers who support different customers.

Widescape enables operators of IBM System/38 or Application System/400 systems to view users' screens displayed on other terminals, browse users' job logs and locate problems without re-creating them. Authorized programmers can reportedly initiate actions and commands that will be followed out as a user's terminal.

Pricing ranges from \$640 to \$3,600, depending on CPU.

Cybra Corp.
One Riverdale Ave.
Riverdale, N.Y. 10463
212-601-7100



Now that everyone agrees how a computer should work,

Judging by what you see on magazine covers these days, the world now wants what the Macintosh computer has always had. And, suddenly, the idea that a personal computer should work the way people do has been embraced by virtually every major player.

Well, since "Mac-like" is the promise on every lip, this might be a good time to point out just what a Mac[®] is like.

What makes a Macintosh a Macintosh is not just cheerful icons, a mouse, pull-down menus and other surface manifestations.

A Macintosh is a Macintosh from the inside out. Conceived from the chip up to work intuitively and visually.

Because it's truly consistent, the entire family of Macintosh personal computers all run the same software with identical point-and-click simplicity. Because it's a true system, Macintosh printers and other

peripherals all connect together quickly and logically. Just plug them in and turn them on.

Because we engineer both the hardware and its operating software, Macintosh runs with the smooth speed and precision you'd expect from any perfectly integrated design.

And because Macintosh isn't a "graphical" shell grafted on top of a character-based system, it doesn't expend lots of expensive computing power trying to do something it wasn't designed for.

Which is why, for less than it usually costs to buy the software and the high-end hardware needed for a Mac look-alike, you can have the true article.

Instead of making do with a handful of graphicized programs, you can choose from the thousands of highly innovative business appli-



try the only one that actually works that way.

cations developed specifically for Macintosh over the last seven years. And instead of patiently following the long path from yesterday's MS-DOS to Windows in the interim and to OS/2 in the someday you can make one simple step to Macintosh.

The benefits of that step, according to a new independent study* by Diagnostic Research, Inc., are considerable.

It seems people prefer a machine that works like people do. And they get more done with it. Users rated Macintosh 14% higher for overall satisfaction and 13% higher for performance than for PCs running Windows. Which, according to information managers in the same study, translated into productivity ratings which were 32% higher.

Meanwhile, what would you sacrifice by making the change to Macintosh? Not your PC files. Every Macintosh equipped with an Apple®

SuperDrive™ disk drive moves information between a Macintosh and an MS-DOS or OS/2 PC on standard 3½-inch floppy disks.

And not your PC programs, either. With products like SoftPC a Macintosh can run virtually any DOS application.

We invite you to call 800-538-9696, ext. 875, for the names of your nearest authorized Apple resellers.

Then come in and see what inspired the monumental changes you've been reading about.

After all, now that everybody else is trying to sell you a Macintosh, maybe you should buy one.

The power to be your best. 



From Forerunner to Front Runner.

The WY-150 arrived ahead of its time. It set price/performance standards that will remain for years to come. And we're still moving ahead, leading the way into the new decade. With the flexibility and connectivity that bridges the worlds of ASCII, ANSI and PCs. All while meeting the most exacting ergonomic standards at an affordable price.

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XENIX, MS-DOS, Concurrent DOS, PC-MOS, and PICK.

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Of course, the WY-150 is backed by the service and support of Wyse. The world's leading independent terminal maker.*

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PCs & WORKSTATIONS

MICRO BITS

James Daly

Don't hold your breath



Forget about the overpriced Macintosh portable, which is about as luggable as a cinder block. Stop moaning for a low-cost Macintosh. And who cares if the arrival date of System 7.0 moves further back each time John Sculley slips into a brand-new Italian suit?

Apple's greatest challenge today — especially in selling to the big-bucks corporate accounts it is always chowing about — has nothing to do with filling in the cracks in its current product line. Apple executives say those deficiencies are on the road to correction.

Instead, Apple needs to concentrate on filling in the blank that is driving more and more users into fits of hair-pulling frustration: Providing an adequate service and support infrastructure.

Take Kim Arledge, for instance. From her office perched high above the University of Texas campus in Austin, Arledge can see a lot of things: the magnificent beauty of the central Texas hill country, the rolling storm fronts that regularly sweep through the area, birds

Continued on page 54

Is PC industry becoming deathly dull?

Windows gala proves that showmanship now outweighs innovation

ANALYSIS

BY CHARLES VON SIMSON
AND PATRICIA KEEFE
CW STAFF

Cool! It's Microsoft Corp. Chairman Bill Gates' talking head, larger than life, extolling the virtues of his pet project, the latest, super-duper version of his windowing interface for DOS.

Wow! A user gets sucked through his screen into the fantastic and wonderfully wacky world of behind-the-scenes Windows 3.0 gongs-on.

Oh, brother. Attendees stand

and cheer the arrival of a product that has taken years to perfect.

The thunder and glitter surrounding the recent unveiling of Windows 3.0 was such that one San Francisco radio broadcaster actually compared Gates to Preston Tucker, the legendary automobile maker whose innovative designs terrified Detroit in the 1940s. That kind of talk raises the question of just how much salesmanship is too much.

The media, users and developers all promised they would not be tricked into caring about something as trivial as the next version of an interface, but most

and the industry talked about it. People laughed at the lameness of his presentation but packed halls in several cities to see it.

Is Gates and his beloved Windows that sparkling? No. It is more likely that the personal computer industry has become that boring. Wall Street analysts recently have been saying repeatedly that the industry needs something more than word processors and spreadsheets to really take off again.

Preston Tucker didn't need a seven-foot video screen. He might have used one had it been available, but then he would have

walked into the crowd to press the flesh, to make people buy into his idea and his product. Those at the Windows 3.0 announcement saw a stiff Gates, on the other hand, steering as far as he could manage from the crowd.

At the Windows 3.0 event, software publishers spread out across the land could be found pitching the wonder of what analysts and users received as mostly mundane products.

With few exceptions, except the best anyone could do in the way of innovation was the solitaire game that Microsoft is including in Windows. After that, it was tool kits and word processors, much the same as it has been for the last 10 years.

Continued on page 53

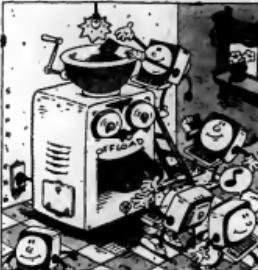
FEATURE: DOWNSIZING

Coding cooks on personal computers

BY PATRICIA KEEFE
CW STAFF

A recent survey reported that 60% of us work more than 40 hours a week, and 20% work more than 50 hours a week. Programmers were too busy to answer the survey." — Humor item from the June 1990 "Multimedia Reporter."

Ain't it the truth. In information systems shops across the country, legions of mainframe programmers are toiling endlessly on a treadmill of backlogged applications. Standing on the sidelines are impatient users and idea-wielding executives exhorting them to code ever faster. Unfortu-



Fred Scherzer

nately, many mainframe shops have already hit the wall in terms of processing power, programming costs and applications delays.

For many companies, more big iron is not the answer. Instead, they are taking their cue from the application downsizing trend and have begun to push the development cycle for mainframe packages down to personal computers, so-called programmatic workstation or the occasional minicomputer. In this way, companies can code off-line on PCs and then upload the code onto the host. In many cases, this strategy is paying off.

For example, in 1982, Bryce D. Segar was asked to take charge of a seemingly endless development cycle.

Continued on page 53

The COBOL Programmer Workstation and Its Impact on Productivity The Micro Focus Developers Seminar Schedule

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*PC WEEK, May 7, 1990. **Doubt LocalTalk connection dependent on NetWare 386 NLM due Fall 1990. Maximum connection achieved today via standard bridges.



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Heartbeat of hospital lies in diagnostic system

ON SITE

BY CHARLES VON SIMSON
CW STAFF

PALO ALTO, Calif. — In hospitals across the nation, sophisticated electronic heart monitors absorb enormous amounts of data on the health and progress of patients. A doctor then takes the information about blood pressure and heart rates and records it on a paper chart with a pen.

Much is lost in the translation. Even in the heart of Silicon Valley, the primitive data interpretation methods used by doctors at the Veterans Affairs

Medical Center could not keep up with the wealth of information being supplied by diagnostic equipment.

"The process was error-prone and time-consuming," said Dr. Adam Seiver, chief of general surgery at the center. "We were at the mercy of bad handwriting, errors in math and different methods of entering data."

In November 1989, the center completed the installation of 23 Sun Microsystems, Inc., workstations aimed at supporting clinical activities, including 14 workstations in the intensive care unit.

The Unix systems run propri-

etary applications software from Emtek, Inc., a Tempe, Ariz.-based medical systems integrator. The units are linked to each other and to diagnostic equipment via Ethernet and Sun's Network File System protocol.

Using the computers, doctors can call up a screen that shows which patients are in which beds. To access patient information, doctors click a mouse to select the appropriate bed number. A spreadsheet format then appears, with the vertical axis showing up to 48 categories of information such as blood pressure and fluid intake/output. The horizontal axis shows the progression of time, typically in one-hour intervals.

With some information, such as fluid intake, must still be keyed into the system, much is updated automatically from electronic diagnostic machines. The hospital ultimately plans to auto-



Hospital uses Sun workstations for better patient care

mate even fluid intake by using infusion pumps that will communicate their activity to the network. Seiver stressed, however, that some information will still be verified by nurses or physicians.

"Before we installed the system, we could never fully trust our handwritten notes about figures," Seiver said. "We frequently had to track as many as 14 intravenous inputs and five outputs on a patient, calculate totals and hope the handwriting was legible. Now the whole process is automatic and accurate."

In addition to automating and standardizing the collection of data, the system gives doctors a better picture of trends in a patient's condition. With a paper-based reporting system, doctors could not get a clear picture of a patient's status from the full range of diagnostic information. "We were surrounded by all

this empirical data, but because we didn't have the tools to interpret it, we had to resort to intuition for many decisions," Seiver said.

The system has also replaced paper filing in storing patient information. Every minute's worth of information is saved on disk and can be accessed for 24 hours, after that it can be easily disseminated by doctors — typically at hourly intervals for stable patients. The on-line record gives doctors an easy method of tracking progress and reaction to treatments.

"Previously, we kept patient records at bedside for 48 hours and then stored them in file cabinets," Seiver said. "Digging out those records to review changes in health and treatments was a daunting task, particularly because it was hard to maintain them in chronological order."

Take Borland boasts with grain of salt

BY CHARLES VON SIMSON
CW STAFF

SCOTTS VALLEY, Calif. — Borland International was playing fast and loose with market numbers last week, making some heady, but unsubstantiated, claims about its momentum in the personal computer spreadsheet arena.

However, while analysts acknowledged that its Quattro Pro software has made strong gains against products from Lotus Development Corp. and Microsoft Corp., none would confirm the company's dramatic numbers.

Two weeks ago, Borland announced that its spreadsheet market share in the U.S. and Canada had increased from 5% in the second quarter of 1989 to 28% for the first quarter of 1990, according to figures derived from the Software Publishers' Association (SPA).

The SPA distanced itself from Borland's findings, saying that it provides only raw data to members and that much of the interpretation was based on confidential member-provided sales num-

bers. The SPA provided aggregate numbers on product shipments, and Borland used its own confidential market figures to derive its percentage of the SPA's total. "I wish they wouldn't do that," said Ken Wasch, executive director of the SPA. "That kind of claim is impossible for us to verify."

Techtel Corp., an Emeryville, Calif., market research firm released a study last week saying that for the first quarter of 1990, Borland shipped at least one unit of Quattro Pro to as many sites in the U.S. as Lotus did of 1-2-3, Version 2.2. "That is the first time in five years of measuring the market that a competitor has matched Lotus," said Michael Kelly, president of Techtel.

Kelly agreed that the pricing of Quattro Pro may have been the most significant factor affecting its penetration, and it remains to be seen whether it can maintain its position once it returns to sustainable price levels. Techtel had no data on overall market share.

Analysts quickly pointed out that site penetration is not equal

to market share. For the first quarter of 1990, Quattro held about 6% of units sold through dealers in the U.S. market vs. about 26% for Lotus, according to Auditix and Surveys, Inc., a New York-based market research firm. "Borland has gained one or two percentage points, but not much more," said Carl Ravitch, senior vice-president. "The Techtel study says that selling one evaluation license to a company is the same as selling 100 platform systems."

Neither International Data Corp. nor Datapquest, Inc., two industry market research firms, could confirm Borland's findings, saying either its Q1 1990 figures were not complete or that they did not track market share in a similar manner.

"There is no question they have been shipping a lot of product," said Nancy McSharry, an analyst at IDC in Framingham, Mass. "But the \$99 promotional price is so low that the buy is painless. People aren't changing platforms, they are simply using the cheap licenses in addition to Lotus and Microsoft."

Mach attack for Intel 386

ANAHEIM, Calif. — Mt. Xiu, Inc., a software development company based in Berkeley, Calif., last week announced that it will provide Mach operating system source code for Intel Corp.'s 30386-based computer systems.

Dubbed Mach-for-386, the source code is targeted toward the academic research community and commercial developers. According to the company, it is scheduled to be available before

the end of the third quarter and will run on several common AT-bus IBM Personal Computers and compatibles, as well as on several Compaq Computer Corp., Intel and Hewlett-Packard Co. platforms.

Mach, a multiprocessing operating system, was developed at Carnegie Mellon University and was designed to provide a foundation for building modern Unix and Unix-like software systems on new architectures.



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Clone makers slash PC prices

BY ALAN J. RYAN
CW STAFF

WESTBORO, Mass. — Leading Edge Products, Inc. and Dell Computer Corp. recently implemented hefty price cuts on their personal computer lines, and Leading Edge began shipping its \$1,995 IBM Micro Channel Architecture-based PC.

Albert Aguirre, president and chief executive officer of Leading Edge, said the price reductions are a reflection of pricing bands affecting the entire computer industry. He said manufacturing efficiencies, volume-related component price reductions and increased demand for PCs

have driven the price cuts.

Leading Edge officials recently traveled to South Korea to meet with parent company Daewoo Telecom President Sung Kyun Park to discuss price cuts according to Bob Henderson, senior vice-president of marketing at Leading Edge. "One of the missions of going to South Korea was to give a blow-by-blow of what we could see happening in the U.S. market," Henderson said. "We are designed to be Daewoo's eyes and ears in the U.S."

Joel Kocher, senior vice-president of U.S. sales and support at Dell, said the price cuts at his company — up to \$1,100 — were implemented to more competi-

tively position Dell's fully configured products and to enhance the company's commitment to its customers.

The Leading Edge price cuts will affect the D3/MC, an Intel Corp. 80386SX-based, IBM Personal System/2-compatible MCA product which was originally to be priced at \$2,195 but is now shipping for \$1,995; the D3/25, a 25-MHz, Intel 80386-based desktop unit, which will now cost \$3,995, down from \$4,595; the D3/SX, a 386SX-based system, which will be available for \$1,795, down from \$1,995; and the D2/P5, an Intel 80286-based, 12-MHz system, priced at \$1,396, down \$100 from its original price.

The pricing of the company's laptop computers will not be reduced at this time, Henderson said.

Dell's price reductions affect all standard configurations of its 286-, 386SX/DX- and Intel 486-based desktop and laptop PCs. The company's Dell System 210, a 286-based, 12-MHz PC, was cut from \$2,549 to \$2,349. The Dell System 310, a 386-based, 20-MHz PC with 4MB bytes of random-access memory, 650MB hard drive and IBM Video Graphics Array (VGA)-compatible monitor, had been priced at \$7,599 and was reduced to \$6,499.

Dell's System 425E, which is based on the 486 processor and the 32-bit Extended Industry Standard Architecture bus, was priced at \$9,899 for a 25-MHz model with VGA color monitor and 330MB byte hard drive. The price has been reduced to \$9,599.

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A better look for Super VGA

BY RICHARD PASTORE
CW STAFF

A video standards association composed of monitor and video board makers voted earlier this month for a new, higher refresh rate for Super Video Graphics Array (VGA) displays. For users, the manufacturers' resolution could lead to less monitor flicker and eyestrain. For vendors, it could open up more overseas resale opportunities.

A monitor's vertical refresh rate, measured in hertz, is the number of times per second that the monitor redraws the screen image. Currently, the standard refresh rates for Super VGA displays are 56Hz or 60Hz.

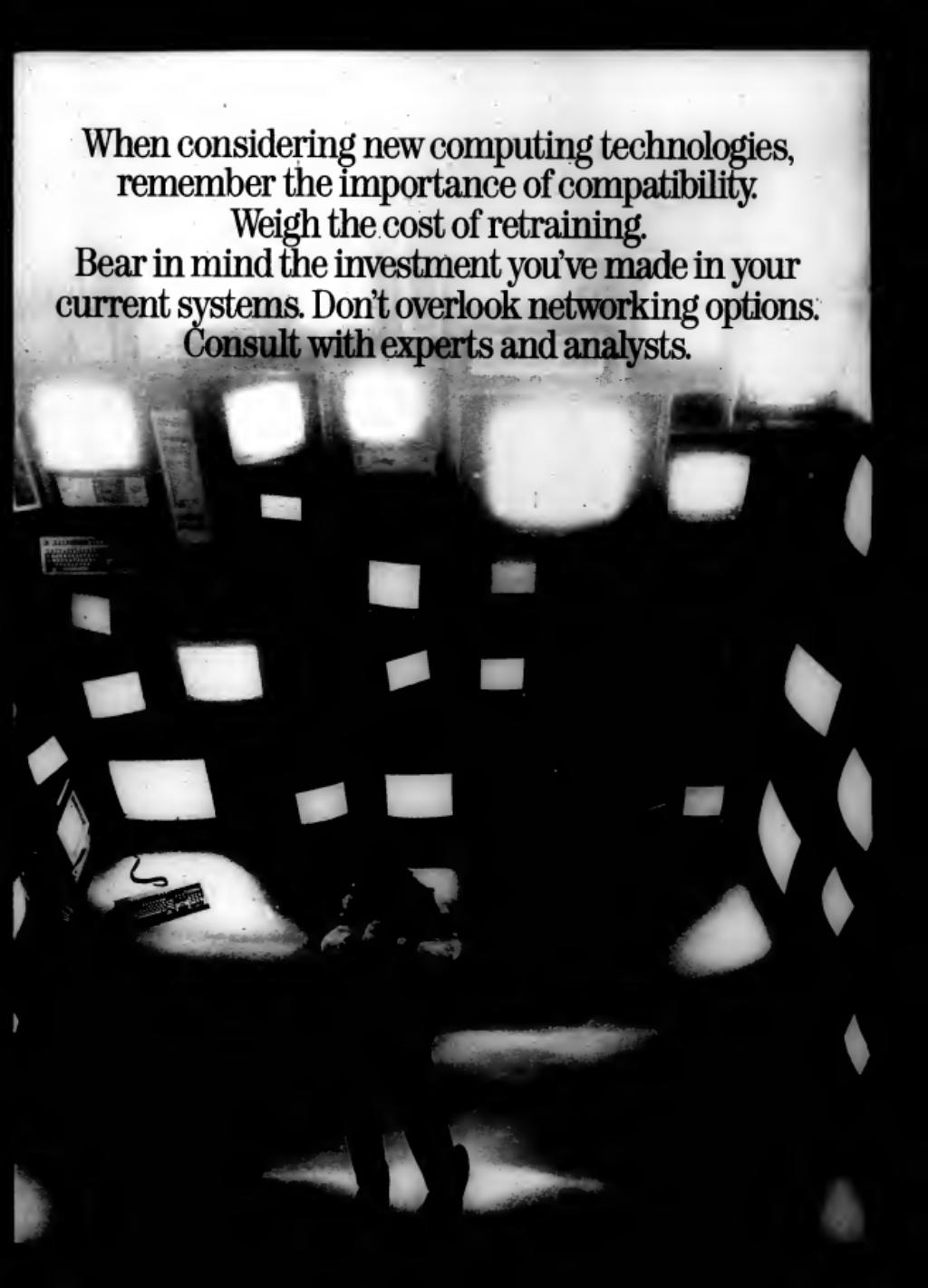
"The performance levels of 72Hz... should lead to reduced eyestrain and tension from prolonged use of a Super VGA board and monitor," said a spokesman at Signs Designs, Inc., a display maker and member of the 1-year-old Video Electronics Standards Association.

Higher standards in Europe
Europeans are already accustomed to higher refresh-rate displays — most European equipment redraws at frequencies greater than 70Hz. The association's endorsement of a 72Hz standard will enhance equipment compatibility and sales in those countries, according to a Video Electronics Standards Association spokesman.

The group, which held its meeting and voting at Complex/Spring '90 in Atlanta, also endorsed design guidelines that would keep current 56Hz and 60Hz monitors compatible with the new 72Hz units.

Members of the Video Electronics Standards Association include NEC Technologies, Inc.; Hewlett-Packard Co.; Mitsubishi Electronics, Inc.; Philips Consumer Electronics; JVC Information Products; and Genesys Systems Corp.

IBM's VGA is largely recognized as the de facto standard for personal computer displays. Unit shipments of VGA cards and chip sets totaled 6.8 million last year, according to Framingham, Massachusetts-based International Data Corp. The figure will rise to 9.3 million this year, the research company estimated. "Super" VGA is a generic term for higher resolution VGA graphics, typically 800 by 600 pixels.



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Downsizing

CONTINUED FROM PAGE 41

for a logistics system that had by then gobbled up 10 years of effort by a team of 10 Air Force Cobol mainframe programmers.

With the help of an IBM 4341 minicomputer with 4-M bytes of memory and a fourth-generation language (4GL), Segar was able to complete in months what was a major conversion from Cobol to Focus, Information Builders, Inc.'s 4GL. Segar, who runs Focus Development, says he was able to condense 12,000 lines of Cobol code into about 2,000 lines of Focus code.

This is an extreme case, to be sure, but it demonstrates the potential benefits to be gained by prying mainframe programmers off the host and moving them onto smaller machines. According to Ralph Williamson, IBM's manager of Systems Application Architecture (SAA) marketing, the price of an IBM 3090 mainframe runs from \$150,000 to \$200,000 for each million instructions per second (MIPS), whereas on a 4-Mbyte IBM Personal System/2 Model 70, the cost per MIPS plummeted to about \$1,500.

Midnight programmers

Perhaps more typical of PC-based development enthusiasts is Charles Standback, IBM's consulting product administrator for SAA marketing. When he thinks back to life before IBM, Standback says he "vividly" remembers scheduling midnight programming sessions on the mainframe. "We were the low priority, and that was the only time I could get," Standback recalls. Worse, nocturnal work schedules meant costly overtime pay.

"PC flexibility allows you to program when it's right for you, not the water-cooled equipment," he says.

Nowadays, mainframe programmers have access to the host during normal working hours, but system overload often leads to unacceptable response time. Other issues of contention include maintenance, project and quality control and the cost of maintenance. MIPS — all of which have fueled a budding interest in the comparatively cheap, independent and graphically oriented PC-based programmer workstation.

Downdesizing development cycles to programmer workstations has attracted a shop such as Rockwell International Corp. in Seal Beach, Calif., which runs all of its applications on mainframes.

To free up space on its IBM 3090 mainframes and cut down on an estimated average IBM TSO cost of \$15,000 per programmer per year, Rockwell is encouraging 2,500 programmers to switch to its homegrown programmer workstation. Initial returns from one test group indicate that programmer costs can be cut back to just under \$8,500 per programmer per year [CW, May 21].

Boeing Computer Services in Seattle estimates that it has halved its TSO costs while encountering productivity gains of 30% to 60% among PC-based mainframe programmers. Virtually all Cobol IMS and some IBM DB2 development and stand-alone testing is done on a programmer workstation.

"It's paid off heavily, both in relieving use of mainframe resources and in terms of editing, testing and compiling applications," says Joel Massey, a Boeing business systems analyst. Compared with do-

ing the same work on a mainframe, it took less than six months to achieve a payback on the software, he adds.

The plethora of good debugging tools available on PCs is also attractive.

Massey says PC debugging tools "are absolutely 100% better" than mainframe ones — as well as less expensive. Chris Mitchell, a project leader at RPC Intermediaries, a reinsurance brokerage in Atlanta, claims a host-based IBM CICS debugging tool can easily cost \$20,000. "We got Realia Cobol and CICS for \$20,000, and it's a total development environment for the PC," he says.

The open nature of programmers looking for PC environments ranges from virtually complete PC-based development that is recomplied on the host to systems that offload front-end design functions and MIPS onto the desktop, leaving code generation to the host. Computer-aided software engineering (CASE) tools are largely, partly because tools based on that technology first appeared on the PC. IBM Common User Access compliance is mandatory among users who are considering IBM's AD/Cycle cooperative processing architecture that enables users both to tie into the database and share information [CW, June 4]. Window-based shells, such as Mozart Systems, Inc.'s Mozart, provide "push-button" programming ease when combined with a layer of CASE tools.

Costs and traumas

Of course, there are issues to consider when offloading mainframe applications development to the PC. A big one is the start-up cost. Then there is the trauma facing programmers with 10 or 15 years' experience on the mainframe — who also tend to be older, better paid and have the most seniority.

Products such as IBM's CICS for OS/2 and Caseworks, Inc.'s Caseworks OS/2 Presentation Manager for Cobol can reportedly alleviate culture shock by providing the downsizing programmer with a familiar environment. This is important because frustrated programmers who have a choice have been known to head back to the mainframe ranch at the first sign of trouble. Pride and ego are issues that have to be dealt with.

The considerable investment involved in downloading the development cycle has deterred some mainframe shops. Charles Colpiets, a senior vice-president at The Travelers Corp. in Hartford, Conn., says his shop has looked at programmer workbenches, but he needs to be "100% sure" that the PC-developed code will run the same on the mainframe as it did on the PC.

Many of the packages needed to accomplish the switch first came on the market with hefty price tags. For example, some development environments alone have run as high as \$2,000 per desktop. Rockwell's Programmer Workstation package initially cost \$20,000 per workstation, but the company has since gotten the cost down to just under \$10,000. One hidden cost is the inevitable move to a network, many users caution.

Steven Goldberg, director of engineering at Monarch Marking Systems, Inc., a maker of barcode readers in Dayton, Ohio, concedes that it is hard to prove raw dollar savings, adding that he suspects there are more "soft" savings to be had, particularly on a network. Users say these include better designed software, easier code reviews and time savings throughout the stages of development.

PC industry

CONTINUED FROM PAGE 41

Who would have thought in 1981 that the PC business would have to resort to such a rehearsed stage show to sell the future? Tens of thousands of people saw a kid crawling blinking out of the dim light of a garage and charmed the world. Last month, even three million dollars' worth of lights and kitch left users and analysts yawning.

The PC business used to be about cutting-edge technology. Today, people see it as a brand management business that hangs not on blowing people away with function, but rather on creating perceptions about the market positioning of products.

The industry has reached a point at which people will line up around the block, as they did in San Francisco, to get into a product introduction. Windows 3.0 is recognized as a strong product. After all this time, DOS has finally caught up with the Apple Computer, Inc. Macintosh. Despite the strengths of the product, users and analysts may have overreacted. Closer examination of Windows 3.0 indicated that Microsoft has not reinvented DOS.

Ten years ago, it was not necessary to convince people that they needed the latest advance in technology. They were already salivating at the prospect of a desk-

top computer that packed a bigger punch than an 8K-byte memory.

Today, users put the brakes on purchasing the most advanced system for the sake of it. Many said they believe they are technologically saturated and insist on proven business functionality before they spend. Users said they do not need another project manager or automated date book. No longer driven to buy, they now must be convinced that they need new bells and whistles.

Today, even Microsoft resorts to press briefings designed to correct "misconceptions" about strategic relationships, market targets and product capabilities. The industry is in an era of "goalpeak," long s

staple of IBM in the



Vern Akers

mainframe world. This is seen as Microsoft's way of indicating it is committed to achieving a certain design goal, but critics note that Microsoft will not commit to delivery or a specific date — or even, in some cases, to what the technology will look like.



WHY THE 1990 CENSUS IS COUNTING ON VIKING DATA ENTRY

When the U.S. Census is taken in 1990, data will be key-entered with Viking software. About 160 million households will be asked as many as 60 questions per person. Viking Data Entry (VDE) system will be used to record responses. VDE software was selected because it is ...

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These are just a few qualities you'll learn to count on from all Viking products: Forme Manager (VFM), Data Manager (VDM), Control System (VCS), and the new VIDE, which will be in a new version 3.0 release on multiple computer platforms.

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4806 East 67th Street, Suite 100,
Tucson, AZ 85713-4959.
PHONE: (602) 461-8144;
FAX: (602) 464-2701.



Daly

CONTINUED FROM PAGE 41

of every stripe.

But no matter how hard she squints, there is one object she says she's never been able to see on the horizon: decent support for the more than 10,000 Macintosh systems she has control over.

"Apple has a lot to learn about providing support for the MIS community," Arledge says disconsolately. "The Mac is not a toy anymore but a critical part of our business environment. We can't afford for it to be [broken]."¹ Instead, Arledge relies on a squad of homegrown technicians who can tear open a Mac with the ease that some people shuck oysters. It

works, sure, but it's like telling the guy who buys a fleet of BMWs that he can kick around under the hood each time he hears a knock or ping.

While price/performance comparisons were the battle cry of the 1980s, users are rethinking their priorities. The 1990s promise to be the age when support services achieve paramount importance. Users are becoming more demanding, and the strength of the warranty is now more an important consideration as the hardware's capability.

Apple is not alone in this neglect. Service problems so endemic to the industry that users have learned to become more self-reliant. According to a study by The Ledger Group, more than 40% of the desktop users surveyed saw themselves as the primary provider of services for their workstation software, network support and training needs. I'll wager that, if given the choice,

KPMG Peat Marwick and EDS to handle integration and management services.

However, even Apple insiders confess they have only taken but the first steps in a long journey. "Today's corporate use clearly goes beyond the service and support we can offer today," says Morris Tardalsky, vice president of customer support products and services.

Apple is not alone in this neglect. Service problems so endemic to the industry that users have learned to become more self-reliant. According to a study by The Ledger Group, more than 40% of the desktop users surveyed saw themselves as the primary provider of services for their workstation software, network support and training needs. I'll wager that, if given the choice,

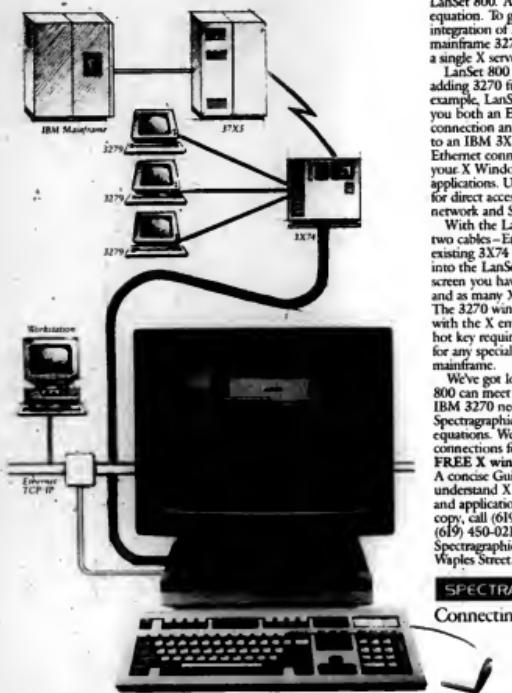
most users would like to have their hardware and software support services performed by the equipment manufacturer.

Director of Apple Integrated Services James O'Gara says that Apple has been working on the problem. According to O'Gara, the firm is considering a variety of contract and subscriber services ranging from custom application development to a SWAT team that dashes out when your system goes down. But those efforts are still pilot programs, he says.

That's an awfully long time to someone thinking about purchasing Macs today. But O'Gara says it's all part of the process. "It's not a question of not doing it," he says. "It's just a question of when we'll work out the kinks."¹

While the ball is still in the air, Apple may also want to consider other options. Some vendors have moved to restructur-

X+3270=LanSet



LanSet 800. A new X Window equation. To give you full integration of X Windows and mainframe 3270 connectivity in a single X server.

LanSet 800 has several ways of adding 3270 functionality to X. For example, LanSet 800/3270dc gives you both an Ethernet TCP/IP² connection and direct connection to an IBM 3274 controller. Use the Ethernet connection for access to all your X Window and other UNIX applications. Use the IBM connection for direct access to your SNA network and SNA applications.

With the LanSet 800/3270dc, two cables—Ethernet and your existing 3274 coax—plug directly into the LanSet X server. On the screen you have a 3270 window and as many X windows as you like. The 3270 window is fully integrated with the X environment, with no hot key required. There's no need for any special software on your mainframe.

We've got lots more ways LanSet 800 can meet your X Window and IBM 3270 needs. Check out all of Spectragraphics' X Window equations. We have the right connections for you.

FREE X windows Guide. A concise Guide to help you understand X window technology and applications. For your FREE copy, call (619) 587-6969, FAX (619) 450-0218. Or write, X-Guide, Spectragraphics Corporation, 9707 Waples Street, San Diego, CA 92121.

SPECTRAGRAPHICS

Connecting with your ideas.

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ture their service pricing through discounting and packaging of services, rather than charging fixed maintenance fees. The most active area has been in bundled support. Turnkey packages are more common and often include such extras as training and installation.

So if your Mac is acting up, hang in there. The Apple service/support cavalry is on the way. And, as my grandmother used to say, there isn't an electronic product on the market that doesn't benefit from a good swift kick now and then.

By Jim Arledge
West Coast senior correspondent

MCA-based PCs get Freestyle

LOWELL, Mass. — Wing Laboratories, Inc. recently released a new version of the Freestyle personal computing system designed for IBM Micro Channel Architecture (MCA)-based personal computers running Microsoft Corp.'s Windows 3.10.

According to the company, the latest version allows users to choose the Freestyle pencil, instead of a mouse, as a pointing device in the Windows environment.

The product provides MCA-based PC users with Freestyle handwriting annotation, electronic mail and graphical desktop management capabilities. Facsimile functions are also available.

Wing is researching a Windows 3.0-compliant version of Freestyle, a company spokeswoman said, but specific product information is not yet available.

The latest release updates both the Freestyle/Light software package and the standard Freestyle system, a combination hardware and software platform that includes the electronic tablet, pencil and icon-based PC software. The core package, including the interface card and cable, costs \$995 and is available for immediate delivery.

BLACK IS BLACK. BLUE IS BLUE. RED IS BEST.

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The computer company
IBM is the world's largest manufacturer of computers. It is also one of the world's largest companies. IBM has over 100,000 employees in more than 100 countries. IBM's products include personal computers, mainframe computers, and server systems. IBM's software products include operating systems, databases, and application software. IBM's services include consulting, implementation, and maintenance services. IBM's products are used in a wide variety of industries, including finance, healthcare, manufacturing, retail, and government.

The Expert in computing





Printers



386 Enhanced



International



Keyboards

Now, all it takes is and you're

It's only fair to warn you that exposure to new Microsoft[®] Windows[™] version 3.0 has been linked to obsessive and habitual usage. Why?

Because with a simple click of the mouse users can connect to the network, even access and manage network resources. All without cumbersome keyboard commands.

Which means users are now able to share data. Not frustration.

While in the interest of time, the Windows 3.0 graphical user interface

was designed to be easy to learn. And use. Neophytes, not to mention troglodytes, will be up and running in no time. With virtually no training.



Now, 286/386[™] machines running MS-DOS[®] will no longer be limited to 640K. So there are no more impediments.

Users can even enjoy a network connection and at the very same time satisfy the cravings of multiple applications.



Desktop



Parts



Fonts

a point and click hooked.

And since Windows 3.0 has a modular setup program, a single copy now memorizes every user configuration on the network. Which means, so to speak, one size fits all.

Furthermore, Windows 3.0 has redefined its relationship with IBM® 3270 emulation programs. Users can now download corporate data and easily share it with Windows applications. Something we have come to call peaceful coexistence.

One last point. Because Windows

3.0 has been optimized for machines with 1-2 megabytes of RAM, it will go a long way towards protecting your hardware investment.

Call (800) 323-3577, Department L21, for a backgrounder that outlines how Microsoft Windows 3.0 could benefit your corporation.

We're certain that you'll agree it's a habit well worth forming.

Microsoft
Making it all make sense

are registered trademarks and "Making it all make sense" and Windows are trademarks of Microsoft Corporation. IBM is a registered trademark of International Business Machines Corporation. 386 is a trademark of Intel Corporation.

NEW PRODUCTS

Board-level devices

Ariel Corp. has announced a plug-in card designed for IBM Personal Computer AT's and compatibles.

The MM-96 board is based on Motorola's 96002 Media Engine and operates at 100 million floating-point calculations per second. It functions as a development platform or an application daughter card and handles algorithms that demand deterministic or real-time results, the vendor said.

A basic configuration, which includes one 96002 engine and 1M byte of memo-

ry, sells for \$3,995. Versions that include dual 96002 engines start at \$5,995.

Ariel
433 River Road
Highland Park, N.J. 08904
201-249-2900

Matrix Electronic Systems Ltd. has announced a parallel processor board designed for personal computers based on Extended Industry Standard Architecture.

The MP-860 board can be configured with 2M to 20M bytes of memory. As many as eight boards can be interconnected via a message-passing bus to form a

parallel processing platform that can provide 640 million floating-point operations per second and 320 million instructions per second, the vendor said.

The price of an MP-860 configured with 2M bytes of random-access memory is \$6,300. The board is scheduled for release in the third quarter.

Matrix
1055 St. Regis Blvd.
Dorval, Quebec, Canada H9P 2T4
514-685-2630

Unix software

Apparel Business Systems, Inc. has announced a Unix version of its business management software system designed for use on IBM Personal System/2s and

RISC System/6000 workstations.

The ABS software package covers all facets of accounting, financial management, order entry, control and component and finished goods inventory, according to the vendor.

The list price of hardware and software starts at \$25,000. The price of a hardware and software installation for an IBM Application System/400 begins at \$60,000. A 24-user RS/6000 configuration costs \$66,500.

Apparel Business Systems
Lee Park
Conshohocken, Pa. 19428
215-940-0880

Peripherals

A line of dot matrix printers designed for personal computer and desktop applications has been announced by C-Tech Electronics, Inc.

The products include the nine-pin Prowriter C-240 and wide-carriage Prowriter C-245, both of which are equipped with a 19.25K-byte buffer that enables multiple-page documents to be printed without jamming; the 24-pin Prowriter C-510 and wide-carriage C-515, both of which include a 14-page, 28K-byte buffer; the Prowriter C-610+; and a 28-pin Prowriter C-645, which features a 32K-byte buffer that can store up to 184 pages of text.

Pricing ranges from \$449 to \$1,395, depending on model.

C-Tech
2515 Mc Cabe Way
Irvine, Calif. 92714
714-833-1185

Software utilities

Peromics Corp. has begun shipping an add-on product for Lotus Development Corp.'s 1-2-3.

Instant Analyst offers a Smart Colors feature that can be used to highlight parts of a spreadsheet according to user-defined criteria. Common applications include displaying negative values in red, highlighting cells with values below a certain threshold and comparing sales expense figures against quotas or budgets.

The product is available for a suggested retail price of \$69.95.

Peromics
63 Great Road
Maynard, Mass. 01754
508-897-1375

Software applications packages

Computervision has announced that its Personal Designer Revision 4.0 mechanical design software package is now available on Sun Microsystems, Inc. Sparcstation 1 workstations.

The product includes a multiple view capability, which enables users to create up to 30 views of a part and maintain an association with all views; a model mode/draw mode, which allows users to enter text and geometry as three- or two-dimensional drawing entities; and the ability to run in a multiwindow environment.

Personal Designer 4.0 costs \$2,800 or \$5,000, depending on the type of software package.

Computervision
100 Crosby Drive
Bedford, Mass. 01730
617-275-1800



A Classical Approach to Control Of Contemporary Dial-up Networks

The advantages of powerful, sophisticated network control systems while available to manage large leased-line networks, have been denied to dial-up network users. GlobalView ends that disparity.

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trace problems to individual devices and overallocate resources. Real-time and historical data are available via color monitor, with hard copy generated for laser analysis.

GlobalView is comprised of Microsoft® Windows-based software, an evolving variety of modems and other dataconce devices and a compact (7" x 19") equipment rack for use with your 80286-based PC controller.

GlobalView is the classical solution to contemporary network management problems. For specifications, pricing and applications assistance, contact UDS, 5000 Bradford Drive, Huntsville, AL 35805-1993. Telephone 205/430-8000; FAX 205/430-8776.



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NETWORKING

DATA
STREAM

Ellis Booker

Cold War redux



Just when you thought the Cold War had been transformed into a tropical lovefest, with Presidents Gorbachev and Bush joking and playing horseshoes on the South Lawn, the scene is doused by an ice bath of national security concerns.

Two weeks ago, the U.S. Department of Commerce, citing national security issues, blocked US West's plan to construct a fiber-optic communications cable across the Soviet heartland. True, the decision was not a total surprise. At 565 bit/sec., the proposed transmission system, while less than half the speed of state-of-the-art systems, is still far in excess of the 14.06 bit/sec. ceiling maintained by the State Department.

It's certainly appropriate that export controls be maintained on countries that might use our products — be they wood chips, supercomputers or telecommunications networks — to the detriment of ourselves or our allies.

But in this instance, the reasons seem forced. At a time when the computers that can be flown to the Soviet Union are getting more and more powerful, ongoing restrictions on the networking gear is a subtle way to hobble these systems. It's like selling a Ferrari but making sure that the only available high-

Continued on page 60

LAN backup made easy

Networker puts file search ability in users' hands

BY ELISABETH HORWITT
CW STAFF

PALO ALTO, Calif. — A software tool introduced last week by Legato Systems, Inc. is said to relieve network administrators of most of the burden associated with backing up files across corporatewide networks of Sun Microsystems, Inc. systems.

While a number of currently available products "make backup easy and fast," when it comes time to get the file back, it often takes a skilled administrator to search through all the tapes and records to find it, Legato Vice-President of Engineering Robert Lyon said.

Networker Release 1.0 addresses this problem by masking an on-line index of every file backed up, so that the "user who lost the file in the first place and is most capable of saying which one he wants to do the actual search," Lyon said. The administrator gets involved only after the search is done and the correct tape is identified, he added.

Networker may well be the only "legitimate Unix network backup product that takes advantage of characteristics inherent" in a client/server model, as well as Sun's Remote Procedure Call technology, according to Dan Kolkowitz, manager of Unix and network service development for Stanford University's Academic Computing department. As a result, "users anywhere on the network can access resource modules" that perform tasks such as backup, file indexing and status monitoring, Kolkowitz said.

One crucial feature, according to Kolkowitz, is Networker's multithreading capability, which allows multiple clients "to be backed up at the same time at the same rate."

The traditional sequential method of backing up one disk at a time requires "that someone be there" to set up the next job as soon as the previous one is done, Kolkowitz said. With Networker, however, "you don't have to worry about coor-

File		File		File	
File	File	File	File	File	File
File	File	File	File	File	File
File	File	File	File	File	File
File	File	File	File	File	File

Networker 1.0 makes an on-line index of every file backed up

dinating times, so you can launch [multiple disk backups] at the same time."

Networker can also back up a set of disks much faster than traditional products, because it does not have to wait for data from a particular disk but can access whichever I/O port has ready, Lyon said. The system also crosses over automatically to another tape when the previous one is full, Lyon said.

The software can be programmed to automatically back up files at intervals of one day or longer, across multiple local-area networks, Lyon said.

Networker also features a windows-based status monitor that is able to notify the operator of pending work as well as potential problems such as a hard I/O error or a file changing during the backup process, according to Lyon.

Fast packets

By the end of 1991, Martin Marietta will be using fast-packet switches at three metropolitan-area network hubs



CW Chart/Patrick

Opting for fast-packet tech

ON SITE

BY MITCH BETTS
CW STAFF

CHANTILLY, Va. — Sure, a company with at least 500 local-area networks scattered across the country could continue to string dedicated T1 circuits among them. But that wouldn't really be managing the corporate network efficiently.

So Martin Marietta Corp., the big defense contractor with 65,000 employees, has decided to become one of the early adopters of fast-packet multi-

plexer technology to do a better job of managing large, bursty file transfers such as LAN-to-LAN connections.

"We'll be able to slow down the growth of T1 lines and utilize what we have much more efficiently," explained Duane Heidel, director of corporate communications networks.

Martin Marietta's information systems group plans to begin deploying fast-packet switches for data traffic in mid-1991, according to Jerry Tiesen, director of corporate communications architecture. He said it is

Continued on page 61



When you compare today's high-performance printers, CIE America's CI-5000 and CI-1000 always top the charts. Because each has the lowest price-to-speed ratio of any printer in its class. And a host of can't-beaten incentives that make these printers the obvious choice.

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For one user or many, there's little else in the class of the Novell-certified, 4-speed, dot matrix CI-5000. Virtually immune to hostile environments, the CI-5000 prints day after day with 18-wide precision at speeds to 540 pages per hour. Standard features include a 16-inch carriage + standard zero-inch tear to eliminate feeds waste + a powerful multi-function front control and display.

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The versatile multi-mode, line matrix CI-1000 is perfect for the high duty cycles of multi-tasking environments. Featuring 940 lpm in draft-mode, the CI-1000 comes standard with • forms generation and bar-coding functions • thirteen international character sets • engineering/scientific notation • a 55-DBV quiet cabinet • compatibility with a wide range of host minicomputers, mainframes and PCs • touch-of-a-button recall of fonts or system operation shapes • a 16" x 16" inch carriage • and cost-saving zero-inch tear-off capability.

Price. Performance. Features. Reliability. What more incentives do you need? Call today!

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Making reservations can be a breeze

Cruiseship's new cooperative processing reservation system could ensure smooth sailing

ON SITE

BY ELISABETH HORWITT
CW STAFF

MIAMI — A travel reservation company is implementing some of the very latest IBM peer-to-peer Systems Network Architecture (SNA) features and services as a way to provide its travel agents with cost-effective, on-line access to up-to-the-minute information on Caribbean cruise bookings.

Cruiseship Information Systems, Inc. plans to release a DOS-based cruise reservation system in the fourth quarter that runs in a cooperative processing environment, said Brad Carter, the travel company's vice-president of operations.

Cruiseship provides electronic cruise booking services for Royal Caribbean Cruises, Inc., which recently purchased the company.

Agents will be equipped with either an IBM Personal System/2 Model 50 or a machine of equivalent power. "The software is in C, so it is pretty hardware-independent," Carter said.

The workstations will also be equipped with enough disk space to handle "a significant database" of information about Royal Caribbean products — the type of information that does not change often, such as departure schedules and itineraries, Carter added.

With this information at their fingertips, agents will be able to use Cruis-



ship's DOS-based reservation software package, Cruisematch, right at their desktops to process a large portion of customers' cruise arrangements and answer questions.

On-line connection to Cruiseship's and Royal Caribbean's IBM Application System/400 hosts will be pretty much limited to accessing volatile information, such as cabin availability on particular cruises, and making the actual bookings and confirmations, Carter said.

Whenever an agent signs on, the system checks to see if it needs to update the agent's files with new information.

If so, it automatically goes into batch mode and sends the updates down. If not, the two systems go right into an interactive session for making an actual reservation, Carter said.

During this transaction, Cruiseship's AS/400 acts as a liaison between the agent's PS/2 and Royal Caribbean's system, passing customer requests for a certain cabin class up to Royal Caribbean's host and passing down availability data, for example.

Once a reservation is confirmed, the agent does some local processing on the personal computer, "collecting names, citizenship, dining preferences — the guts of the cruise reservation," Carter said.

The agent then edits the reservation and passes the finished product back up to Cruiseship's system, which makes sure it is all in order and passes it on to Royal Ca-

ribbean's host, which in turn "confirms and prices it out," Carter said.

Confirmation numbers are sent back to Cruiseship, which sends them down to the

ware Associates, Inc. and Spectrum Concepts, Inc. The firm said it hopes to begin implementing the software and PS/2 workstations on agents' sites in the fourth quarter.

IBM Information Network will act "solely as a go-between," routing calls from various agents and Cruiseship over its SNA network backbone, Carter said. Royal Caribbean and Cruiseship hosts will

communicate over dedicated lines, he added.

Security is one major issue that became more difficult to cope with because of Cruiseship's decision to go with a peer-to-peer network. "There is nothing IBM can do for you in a peer-to-peer environment because they're not running [user queries] through their mainframe," Carter said.

The travel firm's programmers have addressed this problem by developing a security system that includes user identification and password protection, Carter said.

A chip attached to each agent's PC is accessed by Cruiseship's application programs "so that it's all encrypted when it comes to us," Carter said.

Users' queries contain embedded security information that the IBM network code passes on to the travel company, "and if it's not there, we terminate the session," he added.

Booker

CONTINUED FROM PAGE 59

waves are made of dirt and strewn with rocks.

Briefs justifying the Commerce Department decision were circulating in Washington, D.C., last week. Many discussed the alleged "survivability" of fiber optics in the face of a nuclear attack. Yet an argument can be made that "survivable" communications for an enemy are, in fact, desirable. Without communications, how can the enemy surrender? Or, as the movie *By Dawn's Early Light* illustrated, how can countries avoid an accidental dental strike or all-out warfare if leaders on one side cannot communicate with their own forces, let alone the enemy?

Moreover, worries that security safeguards proposed by US West and its European and Japanese partners on the project would be insufficient to prevent a "diversion" of this \$500 million civilian system to Soviet military applications do not bear up under analysis.

A US West spokesman put it best when he said he strongly doubted Soviet military planners would want to use a fiber system "designed, constructed and supervised by Western countries." US West has said it will ask a Commerce Department review of the decision — an effort that isn't given much hope for success. A day after the US West ruling, the 16 other member countries of the Coordinating Committee on Multilateral Ex-

port Controls (Cocom) agreed with the U.S. to hold all fiber exports to the 140M bit/sec. level. US said it was confident it could prevent non-Cocom countries from providing the technology and searching the Soviet contract.

The real reason the trans-Soviet fiber line plan was kilobotted, according to Washington, D.C. insiders, was that it would have made the job of high-tech eavesdropping more difficult.

However, the Bush administration could not play up this principal objection, since this would mean first admitting to our eavesdropping activities (as if that would come as a surprise to anybody), and second, implying that we fundamentally do not trust our newfound Soviet friends, which sounds too Reagan-esque and old-fashioned.

It's worth recalling that liberalized export policies serve a higher objective than improved commerce: They seek to upgrade the basic infrastructure and economies of these nations. Such policies have at their foundation the belief that access to Western know-how will make Eastern Bloc countries more prosperous, more politically stable and, ultimately, more attractive as potential markets for Western commerce.

That's still sound reasoning. And it should guide the Commerce Department's review of its decision on the trans-Soviet fiber case.

Booker is Computerworld's Chicago correspondent.

GEIS eyes hospital market

BY JIM NASH
CW STAFF

Hotel chains are growing disappointed with their reservation systems — disappointed enough to outsource the heart of their systems. At least, that is the hope of General Electric Information Services (GEIS).

GEIS, a division of General Electric Co., recently began marketing its own hotel reservation service.

Called Manor System, the service provides support and software linking IBM or compatible personal computers in each of a chain's hotels to GEIS' mainframes in Rockville, Md.

Golden Tulip, an Amsterdam-based hotel chain of about 225 buildings in almost 60 nations, is the only foreign company using the system, said Mike Bradley, hotel industry market executive at GEIS.

A capable manner

Bradley said that Manor includes software for IBM 3270 emulation, hotel-chain reservation operations and individual hotel operations. It also provides gateways between hotels and airline reservation systems such as American Airlines' Sabre.

Bradley explained that 80% of the processing done with each reservation on Manor will be completed on the PCs. The

mainframes, he said, store total room availability and price records. Using X.25 links, each PC receives an update of this information each night.

The same links allow the mainframes to be updated each time a reservation is confirmed by a chain's telephone reservation operation, an individual hotel's reservation agent, or a travel agent.

Manor, Bradley explained, is being marketed modularly, allowing hotels to mix and match options that they require. One option offers full-color hotel representations that can be called up on a screen.

Ready for change

Bradley said a GEIS survey of 25 U.S. and European hotel companies revealed that many large chains are ready to rid themselves of their own centralized reservation systems. He claimed that hotel executives believe their systems are currently inadequate to handle the number of transactions.

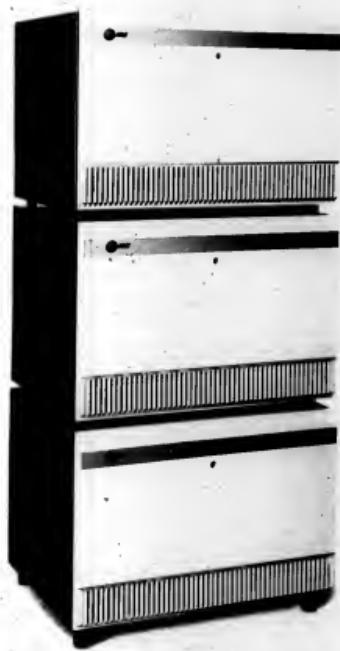
Executives reportedly said they feel that "a substantial overhaul of their system will be necessary in the next one to five years," according to Bradley.

He declined to reveal how much the service would cost, saying that prices would vary depending on a chain's size and the options requested. The hotels surveyed were spending between \$3 and \$10 per reservation, Bradley said.



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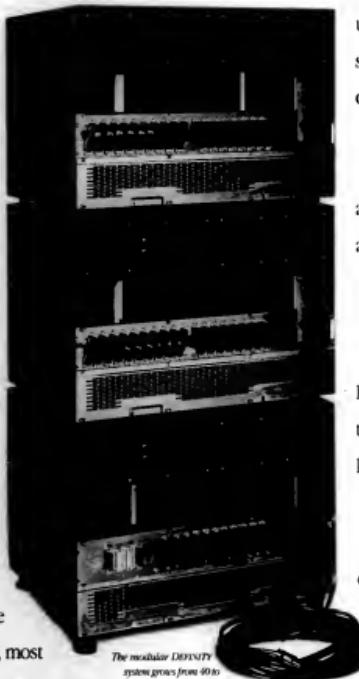
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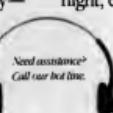
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The right choice.

Gigabit net gets \$15M in funds

BY GARY H. ANTHES
CNET STAFF

WASHINGTON, D.C. — In what may be an unprecedented cooperative effort by industry, government and academia, last week, \$15 million in seed money was allocated to research on a nationwide fiber-optic network operating at speeds above 1G bit/sec., hundreds of times faster than the quickest networks in common use today.

The National Science Foundation (NSF) and the Pentagon's Defense Advanced Research Project Agency are contributing \$15.8 million in seed money to the project, with many times that amount coming from computer and communications companies that will provide research and development funding to the project.

The project's primary goal is not immediate deployment but to "set research started in the technologies needed to get a multisignal/gbit/sec. national network going," and also to make possible planned upgrades to current high-speed backbones such as the NSF's NSFNet, according to Alan Baratz, IBM department group manager, communications and concurrent sys-

tems. The current project is "parallel and complementary to" Sen. Albert Gore's (D-Tenn.) recent efforts to obtain federal funding for the high-speed National Research and Education Network project, Baratz said.

The target user population for the high-speed backbone is scientists and researchers in the academic, military and commercial sectors, who would use the multigigabit backbone to collaborate more effectively with one another and with computers throughout the country.

While no implementation blueprint exists, it is possible that the network could replace the domestic portion of the existing Internet, the umbrella network of research networks. Although the federal government would fund much of its development, its sponsors said it would eventually be turned over to the private sector for commercial operation.

The project, which is being managed by the Reston, Va.-based Corporation for National Research Initiatives (NRI), will establish five test networks for

research in wide-area, high-speed data communications. According to Robert E. Kahn, NRI president, the experimental nets will be used to evaluate alternate network architectures, protocols, experimental switching and transmission techniques, interfaces, operating systems and user programming languages.

Network technology will be evaluated for performance, reliability, scalability and cost, Baratz said. The project will test different architectures' ability to support a variety of applications, including weather modeling, remote medical imaging and telecooledacing. It will also seek ways to distribute single applications across multiple remote supercomputers and to support multi-site research collaboration on wide-area networks.

The project will also look at network management, billing, privacy and other nontechnical issues.

MCI Communications Corp. will provide a data transmission hub for two of the test nets, said Ned Farinholt, an executive staff member of advanced technologies at MCI. The company will

provide long-distance communications over fiber-optic pipes with a capacity of 2.4G bit/sec. In the Southwest, MCI will connect to the local exchange carriers of US West and Pacific Telesis via the Synchronous Optical Network (Sonet) interface definition, which will then provide data to local users in whatever speed they can handle. For example, MCI will go to the Jet Propulsion Laboratory at the California Institute of Technology at 200M bit/sec., Farinholt said.

At the other end of the country, MCI will work with Bell Atlantic Corp. and Nynex Corp. to set up a regional backbone with points in Boston and Philadelphia. Based on Sonet technology, the backbone will support multimedia communications among IBM, Bell Communications Research, MIT and University of Pennsylvania sites, and plans to open networks in New York and Dallas later this year.

These experimental wide-area networks anticipate future commercial service, said Walter Johnston, director of the Prototype Services Laboratory at Nynex. "They would form a public network reference model for future broadband services."

In another experiment, AT&T will upgrade its Xanet test net from 1.5M bit/sec. to 45M bit/sec., with future plans for combining multiple 45M bit/sec. channels into 600M bit/sec. links.

between engineering workstations.

Moreover, the bandwidth sometimes is needed on very short notice. "Martin Marietta may need 200 to 300 people to do a building overnight to start a big project, so bandwidth can't wait 60 or 90 days. It has to be there," Heidel said.

The fast-packet system is one of the leading-edge variants of fast-packet technology. "They will have many vendors to choose from in the next 12 to 18 months, because a flurry of product announcements is expected in that period," he added.

The technology combines fast-packet switching — "fast"

because it eliminates error correction at intermediate nodes and has an abbreviated address — with frame relay, an emerging standard interface that the company will use to optimize bandwidth when linking LANs across the country.

A dedicated circuit is not efficiently used by bursty traffic, but fast-packet/frame relay technology has an activity-detection feature ensuring that bandwidth is used only when needed. This ability to provide bandwidth on demand is especially attractive to Martin Marietta.

Heidel said that data traffic at the company is growing dramatically, with ever greater demands from such "bandwidth hogs" as file transfers between LANs and

intranets, the workstation-to-workstation architecture will correspond to the company's move away from the old "mainframe mentality" to distributed data processing, Tiesen said.

Tiesen said that, during the next five years, the company will migrate from its 15-year-old IBM host-to-terminal network to a new Hybrid Network Architecture that emphasizes LAN-to-LAN connections. Besides fast-packet switches, the company's Hybrid Network Architecture has the following features:

- A private X.25 subnet will be used, beginning in 1991, for electronic mail and electronic data interchange.

- The company will be selecting

NEW DEALS MFS lands Pittsburgh

Metropolitan Fiber Systems, Inc. (MFS), whose fiber-optic-based network services have been varying with local carriers in major cities across the country, recently initiated service on 855 fiber miles in Pittsburgh business districts and announced the network's first customer: Williams M. Mercer, Inc. MFS already has networks operational in eight other cities and plans to open networks in New York and Dallas later this year.

Newbridge Networks, Inc. recently signed a contract to provide equipment for CBS' nationwide backbone network. Newbridge's 3600 Main Street T1 Bandwidth Managers will route traffic between CBS' New York headquarters and broadcast center with broadcast centers in Washington, D.C. and Los Angeles and a corporate data center in New Jersey. The installation's second phase will link the larger CBS-owned and operated stations across the U.S.

Western Union Corp. and Electronic Data Systems Corp. have signed a new 10-year agreement under which EDS will furnish management and financial applications expertise to Western Union, in addition to redesigning the network service company's information systems over the next two years. The agreement, which is valued at approximately \$250 million over the 10-year term, replaces an agreement signed by the two companies in 1985.

New tools through Windows

BY JIM NASH
CNET STAFF

The current flood of products being updated for Microsoft Corp.'s Windows Version 3.0 by network vendors should act to prime the pump for genuinely new network products tied to Windows, according to industry observers.

Analysts that were provided to list new, rather than merely updated — local-area network products announced in relation to Windows 3.0 software came up empty. That, however, did not negatively color their impression of the graphical interface as a viable network component.

The increased ease of use and the ability to engage multiple applications offered by Windows will spawn new products, said Nina Burns, principal at Network Management Solutions in Menlo Park, Calif.

Ernest & Young consultant David Passmore said he expects "RAM cram" to subside, especially in the micro-to-mainframe setting, as Windows-specific products emerge. The memory-juggling capabilities of Windows will make it possible, for example, for Microsoft MS-DOS-based personal computers to support LU6.2 and PU2.1 proto-

cols that enable them to communicate directly with a host as peers, rather than through a terminal-emulation gateway, he added.

Enabling systems to run multiple sessions "end-to-end," or from the host to the client, Burns said, will both throughput and improve session fault isolation. Currently, gateways cannot see multiple sessions to detect problems with individual workstations, he explained.

Today, however, vendors are

primarily announcing Windows 3.0 support for their existing communications products. Wall Data, Inc. in Redmond, Wash., for example, has done so for its micro-frame link. Rumba, which is said to take advantage of the Windows Dynamic Data Exchange feature. This enables users to set up interactive links between host sessions on different windows, so that changes in one window dynamically update the other, Wall Data said.

Consumer Software, Inc. in Vancouver, British Columbia, is shipping a new version of its Network Courier software that takes advantage of freed memory to allow users to send electronic mail and perform other tasks simultaneously.

Fast-packet

FROM PAGE 59

not clear whether it will be used for voice traffic as well.

Steven A. Taylor, president of Distributed Networking Associates, Inc., a firm in Greenboro, N.C., said it appears that Martin Marietta will be one of the leading-edge users of fast-packet technology.

"They will have many vendors to choose from in the next 12 to 18 months, because a flurry of product announcements is expected in that period," he added.

The technology combines fast-packet switching — "fast" because it eliminates error correction at intermediate nodes and has an abbreviated address — with frame relay, an emerging standard interface that the company will use to optimize bandwidth when linking LANs across the country.

A dedicated circuit is not efficiently used by bursty traffic, but fast-packet/frame relay technology has an activity-detection feature ensuring that bandwidth is used only when needed. This ability to provide bandwidth on demand is especially attractive to Martin Marietta.

Heidel said that data traffic at the company is growing dramatically, with ever greater demands from such "bandwidth hogs" as file transfers between LANs and

a standard set of bridges and routers for LAN-to-LAN connectivity later this year, for deployment in 1991.

• A high-speed channel will be implemented for niche applications, such as computer-aided design and manufacturing.

Tiesen said fast-packet/frame-relay "should be valid technology through the late 1990s. However, the asynchronous transfer mode of broadband Integrated Services Digital Network will come along sometime around 1995 and possibly replace that."

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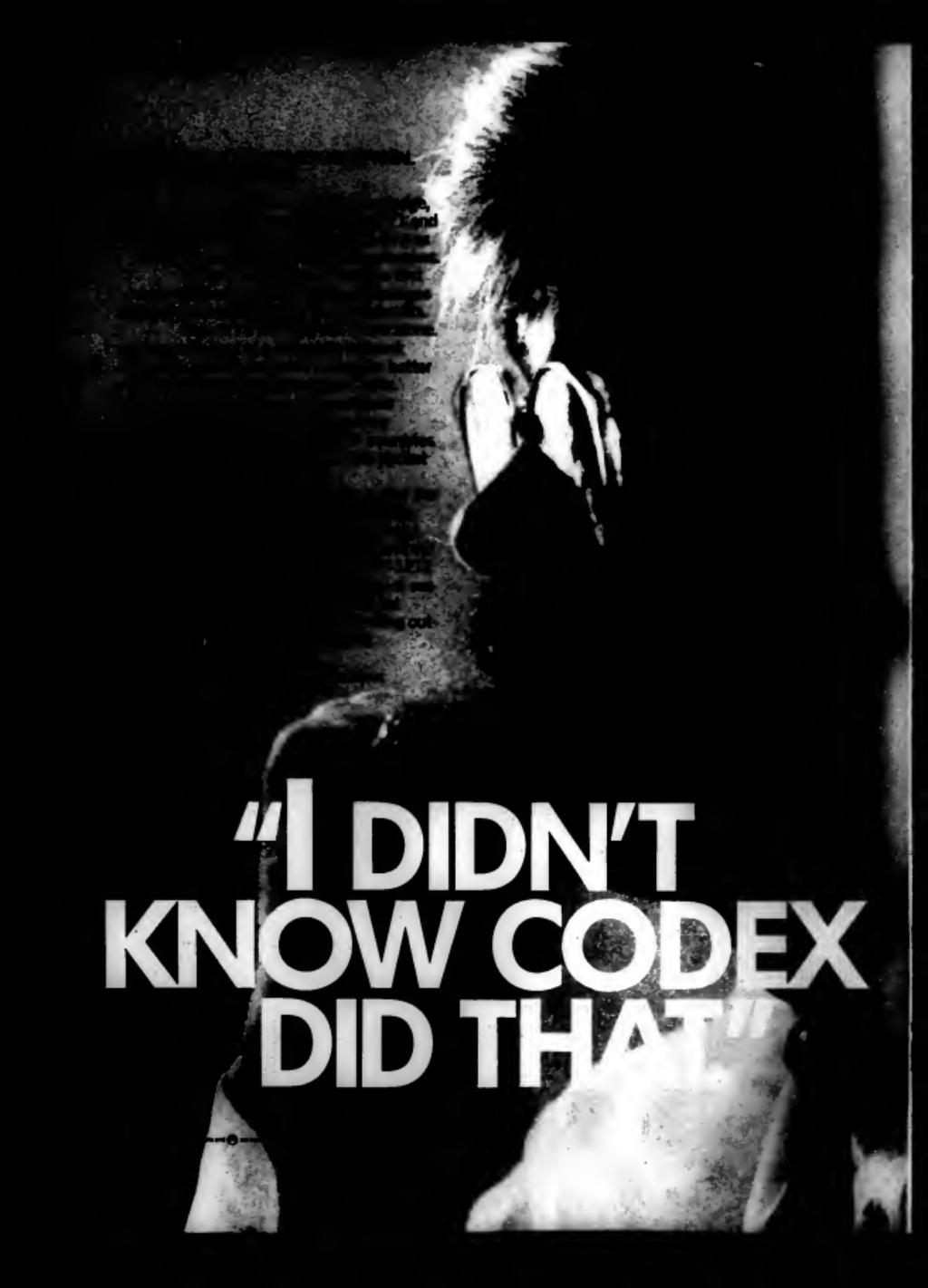
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*The PowerMate
SX Plus*

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NEC

*Manufacturer's list price. Dealer price may vary.



**"I DIDN'T
KNOW CODEX
DID THAT."**

NEW PRODUCTS

Protocol converters

At Drexel East in Boston next week, Hewlett-Packard Co. will unveil its HP 18226A International Standards Organization protocol interpreter, designed for use with the HP 4972A local-area network protocol analyzer.

The product enables managers of multivendor Ethernet LANs to test systems and applications prior to network installation or to troubleshoot interoperability and efficiency problems on existing networks. It can reportedly decode protocols through the Session Layer of the Open Systems Interconnect reference model.

The HP 4972A costs \$950. The HP 4972A LAN protocol analyzer sells for \$18,350.

HP
19310 Pruneridge Ave.
Cupertino, Calif. 95014
800-752-0900

Micro-to-micro

Softrkone has announced Takeover, a personal computer remote-control software package that enables users to access and take over a remote PC.

The product's dialing directory interface includes pull-down menus with keyboard and mouse control. It is equipped



Softrkone's Takeover features pull-down menus

with 5½- and 3½-in. disk sets and requires IBM PCs or compatibles running MS-DOS 2.0 or higher. —

The list price for software for the host and remote PCs is \$295.

Softrkone
Suite 100
327 Office Plaza Drive
Tallahassee, Fla. 32301
904-678-8564

Electronic mail

AT&T and Voicecom Systems, Inc. have developed a network-based voice messaging service.

AT&T Voice Mail enables users to create, process and receive voice messages nationwide at any time of day, seven days a week. The service includes an 800 number that customers can dial to leave messages or place orders and a 24-hour help line.

A one-year contract costs \$9 to \$12 per mailbox, plus usage and 800-line charges. Customers who purchase more than 50 mailboxes will not have to pay mailbox or usage charges for 90 days, according to the vendor.

Clients who switch from competitive services will have installation charges waived. Both offers expire June 30.

erates with DEC's All-In-One, the vendor said.

A license fee for Office Access costs between \$2,000 and \$10,000, depending on the type of DEC system used.

Western Union
One Lake St.
Upper Saddle River, N.J. 07458
201-818-5000

Links

At Drexel East in Boston next week, Networx, Inc. will announce a local-area network interconnection device that provides a repeater interconnection between standard Ethernet (10 Base5) coaxial segments and thin Ethernet (10 Base2) coaxial segments.

The NC-206 10-segment local Ethernet repeater complies with the Ethernet V2/IEEE 802.3 repeater specifications for carrier sense multiple access with collision detection 10Mbit/sec. operation.

The product lists for \$2,495 and is available 60 days after receipt of order, according to the vendor.

Networx
850 Auburn Court
Fremont, Calif. 94538
415-623-3700

Simpact Associates, Inc. has announced a line of X.25 connectivity products available for VMEbus bus, Digital Equipment Corp. Q-bus and Motorola, Inc. VMEbus systems.

Continued on page 66

To find out how easy it is to convert DCA's new IRMA from standard to MCA bus, flip the page.



Continued from page 65

The CPI 2101 and VCI 2000 series implement all CCITT X.25 specifications.

The CPI 2101 is available for VMEbus and Q-bus systems running under DEC VAX/VMS, Ultrix and AT&T Unix System V operating systems. The VCI 2000 is available for VMEbus systems running under Unix System V, University of California at Berkeley Unix 4.2 and Vworks operating systems.

Pricing for the CPI 2101 series ranges from \$9,975 to \$16,250. VCI 2000 series products cost between \$8,800 and \$17,200.

Simpact

9210 Sky Park Court
San Diego, Calif. 92123
619-565-1865

Gateways/Bridges/Routers

Cisco Systems, Inc. has announced a dynamic routing protocol that enables users to build operational computer networks based on the International Standards Organization's Open Systems Interconnect model.

The Interior Gateway Routing Protocol Intermediate System-Intermediate System (IGRP IS-IS) routing protocol can automatically adapt to changes in network topology and perform real-time calculations of traffic, delays and line reliability to determine the best routing paths, the vendor said.

The IGRP IS-IS is offered as a stan-

dard feature with all of Cisco's internetwork routers, whose starting prices range from \$4,000 to \$18,000, depending on model.

Cisco Systems
1525 O'Brien Drive
Menlo Park, Calif. 94025
415-326-1941

OST, Inc. has announced Ebsee 2000, a value-added network processor that combines the switching power of a data communications node with powerful processing intelligence.

The product, which is based on multiple Motorola, Inc. 68020 Application Processing Units, can implement the Unix operating system and run any Unix application that is compatible with AT&T

Unix System V, Release 3. Outside communications are provided via X.25 communications cards that handle up to 200 frames/sec. at line speeds of 64K bit/sec.

Pricing ranges from \$30,000 to \$100,000.
OST
14225-P Sulkyfield Circle
Chantilly, Va. 22021
703-617-0400

Front Ends/Multiplexers

Advanced Compression Technology, Inc. has introduced a multiplexer that integrates voice, data and facsimile channels over 48K to 128K bit/sec. digital transmission facilities.

The SDM-T was designed with five medium-speed channels (up to 19.2 Kbit/sec.) for synchronous or asynchronous data, a high-speed data channel (up to



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ACT's SDM-T multiplexer

64K bit/sec.) for connecting local-area networks to other LANs and up to four Group 3 fax relay channels.

The price of a basic unit is \$2,400, and a configuration with six data and two voice channels costs \$6,000. The product is scheduled to ship next month.

ACT

31368 Via Colinas
Westlake Village, Calif. 91362
818-889-3618

Wide-area networking hardware

Alantec has announced a T1 interface module for its Multilink switch (MLS) that links up to eight local-area networks with a T1 wide-area network connection.

The T1IM supports standard and fractional T1 connections and enables the MLS to multiplex LAN traffic with existing T1 voice traffic without an increase in transmission charges, the vendor said. Each T1 channel on the MLS can be used for voice or data.

The T1IM is available 30 days after receipt of order for \$3,300; the basic price for the MLS is \$8,800.

Alantec
101 Hammond Ave.
Fremont, Calif. 94539
415-770-1050

Racal-Quanta has announced Prenet 5000, a 100M bit/sec. fiber-optic backbone designed for premises distribution and local-area network applications.

The product can transport various data or voice interfaces in LANs or wide-area networks. It includes multi-interface nodes that are supported by 100M bit/sec. fully redundant backplanes. Its nodes can also be used in point-to-point, ring or star configurations, according to the vendor.

A basic unit with one interface costs \$7,600.
Racal-Quanta
5415 E. La Palma Ave.
Anaheim, Calif. 92807
714-970-2966

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MANAGER'S JOURNAL

EXECUTIVE TRACK



William N. Mease was named to the newly created position of manager of information systems at George Lithograph Co., a printing firm in San Francisco.

During the past 15 years, Mease has held top executive positions in hospital organizations with responsibilities that included financial systems and IS.

He has been chief financial officer at French Hospital in San Francisco and Memorial Hospital in Gardens, Calif., as well as controller at Hospital Corp. of America in Nashville.

Mease is a graduate of California State Polytechnic University and lives in Foster City, Calif.

Emile A. Bonneau has been named senior vice-president of operations at Rhode Island Credit Union League in Warwick, R.I., where his duties will include overseeing the league's computing operations.

Bonneau, who has more than 26 years of experience in the banking industry, was most recently a vice-president at Peoples' Bank. He is the immediate past president of the Rhode Island Cleaning House Association and chairman of the Rhode Island Bankers Association Operations Committee.

The Seabrook, Mass., resident is a graduate of the University of Rhode Island and holds an MBA from Bryant College in Smithfield, R.I.

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Weller, Senior Editor, Managerial Computerworld, Box 9171, 375 Conchita Road, Framingham, Mass. 01701-9171.

IS gets its day in the Sun

Oil giant's systems people reap 'subtle but significant' benefits from decentralization

BY NELL MARGOLIS
CW STAFF

Sun Refining and Marketing Co.'s information systems department decentralized last year for the oldest and best reason in the world. "We had no choice," IS director Jack Donohue says.

Philadelphia-based Sun R&M is one of the several companies that make up Sun Company, Inc. At 105 years of age and with nearly \$10 billion in revenue, Sun is one of the U.S.'s venerable oil giants.

Today's energy companies tend to be short on complicity, big on change and death on anything that doesn't help the business. The energy company IS department that wants to survive and thrive, Donohue says, will do well to adopt similar priorities.

Last year, Sun R&M held a four-month companywide brainstorming project called Sun Organizing For the Future. Business and IS management emerged from the project convinced that business systems and applications people had to start working directly in and for the business units they served.

"What we had to do for the business was demystify technology, get people to understand how it could be used for their benefit and then use it," says Donohue, a 23-year Sun veteran who has headed IS for seven years. "What we had to do for the systems people was get them closer to the business problems they were helping to solve."

While it is still early in the game, Donohue says, it appears that these goals are being achieved.

One goal that was not on the agenda was boosting IS people from second-to-first-class citizenship in their company. However, roughly one year after the

SUNOCO MARKETING



Sun R&M's Panceone (left) and Donohue aim to bring IS workers closer to the business problems they are helping to solve

first IS folks left the parochial comfort of their department and set out for such relatively alien territories as Lubes, Fuels, Refining & Crude Oil and Finance, this is the banana they say they have resorted.

Mike Panceone became manager of fuels systems for Sun R&M's Fuels division, reporting directly to the vice-president in charge of that business unit. "Did I feel on the outside before?" Panceone says. "Yes, I did."

Although Panceone says he was not mistreated in any way while serving a Sun business from an IS base, he points out, "Sun wasn't necessarily a first-class citizen. I think that's true of every systems person who is not part of the business of The Business."

The advantage he now prizes was not one he saw coming, Panceone says. Before June 1989, as manager of systems for the Crude Oil group, he re-

ported directly to Donohue and indirectly to the group's vice-president.

"When we first started discussing the possibility of a straight-line report [to a business head]," he says, "I felt that either way would be OK, that I wouldn't feel any difference."

The difference he found, Panceone says, "is subtle but significant. As a solid-line report to a business head, I'm sitting in budget meetings, merit meetings to decide who gets what bonuses — places I'd never been before."

Sun R&M finance manager Tom Fitzpatrick, who now reports to Sun Vice-President of Finance Peter Weitnicht instead of to Donohue, agrees. "You're in the room when decisions are being made," he says. "Just being there is important."

One major reason why, Panceone says, is that mere presence soon trans-

Continued on page 76

Systems buyers agree: Reliability is a virtue

BY GARY H. ANTHES
CW STAFF

A panel of corporate computer systems buyers at the recent Adisop Washington, D.C., agreed on at least two points — low prices do not necessarily win, and vendor reputation is of supreme importance.

Ray Lollar, vice-president of information services at Atlanta-based Gold Kist, Inc., said he relied heavily on credit ratings, analyst reports and customer references in choosing a vendor to provide hardware and software for a 106-store point-of-sale accounting and inventory control system.

He cited such virtues as staying power, reliability, dependability and responsiveness in choosing suppliers.

Neither leading-edge technology nor low cost was a dominant factor, and Gold Kist rejected cheaper options in favor of a company that it said it thought would "remain in the business for the long run," Lollar said.

When Delta Air Lines needed an interactive audio response system for receiving telephone requests from pilots and flight attendants, it cited technical capability as the most important vendor criterion. After that, Delta sought financial strength, company reputation and track record, according to systems manager Harry Burnett.

Burnette said he carefully checked customer references supplied by ven-

dors and was amazed to find that many gave poor accounts of the bidders' past performances. The vendor chosen was not the low bidder, he added.

Richard Elmore, vice-president of information systems at CBS Records International, also cited staying power as a key quality sought in bidders for a new artist royalty system. Two out of 10 bidders were rejected on the basis of reputation, he said. CBS chose Ernst & Young for the job, even though it had submitted a bid substantially higher than the lowest cost proposal.

"The essential message of all this is that there are no tricks, no shortcuts," Elmore said.

BOOK REVIEW

To Dad, with love: Watson Jr.'s Big Blue autobiography

FATHER, SON & CO.
By Thomas Watson Jr.
Bantam Books, \$22.95

It may be hard to imagine for longtime industry pros, but the current generation of computer professionals hardly equates the name Watson with IBM. It has been, after all, 20 years since Thomas Watson Jr. stepped aside as chairman of IBM, marking the end of nearly 60 years of Watson reign at the industry's preeminent company.

To those who remember, however, the name Watson was synonymous with Big Blue. T.J. Watson Sr., the autocratic but benevolent entrepreneur, laid the foundation and built the structure for what became the modern IBM. His son Tom took the company into computers and spearheaded its record-breaking growth.

Now, Watson Jr. has decided to tell his story. It took nearly a decade of persuading by friends and publishing heavyweights, but in *Father, Son & Co.*, Watson pulls out a shockingly candid view of his tempestuous relationship with his father, the great weight that IBM became for him. The book is receiving mixed reviews in the business and general press, but make no mistake: This is a must read.

The book offers an intriguing look inside one of the best known father/son business relationships in history, while at the same time providing a high-level view of the company heretofore missing from the myriad IBM corporate biographies.

True, the book is flawed: It is too long, many of the key IBM stories are a bit sanitized, and Watson's tales of yachting trips, ski houses and his decidedly upper-crust reality can be a turnoff.

Even so, the book is an engaging read, told in a straightforward first-person voice that offers no apologies; it just plows head-on into one of the strangest personal

relationships ever told.

From the outset, Watson paints a picture of a father/son relationship that could serve as the prototype for a good Freudian analysis. Watson Sr. was the classic rags-to-riches, Horatio Alger type, a quintessential salesman who built his business on a deep belief in people and structure. He believed in company songs, mottoes and loyalty. He kept his hand in every aspect of the business, traveling endlessly to meetings, dinners and functions to see and be seen by the IBM masses.

When a train carrying IBM families to a company function in New York crashed upstairs, Watson Sr. climbed out of bed at 2 a.m. and drove all night to the scene. He ordered in extra medical care, paid for everyone's expenses and spent the next day in the hospital with the injured.

The senior Watson's generosity was matched by an obsessive eye for detail and an enormous ego. His picture hung in every IBM office in the land. He became personal buddies with the likes of Franklin D. Roosevelt and succeeded in becoming bigger than the company he ran.

For the older son, David's success was a hammering and heavy burden. Born into wealth and privilege, young Watson faced what had no way to copy his father's feats. Yet he felt compelled to confront and conquer this daunting demand from early on.

The relationship Watson describes is at times bizarre. For example, he describes endless, intense fights with his father, fights that would leave both men in tears and emotionally shattered. But immediately, a simple note pledging admiration and love would patch the wound and allow the pair to struggle forward to the next explosion.

In a recent interview with *Computerworld*, Watson said he intended this book to be a "love story." If so, it is a painful love story indeed.

Watson gives himself no quarter. He is terrifically hard on himself throughout the book and often portrays himself as a spoiled, temperamental brat who felt bad but would still use his father's influence whenever it was needed.

For example, as a young IBM salesman in 1940, he was handled a major account by his father and achieved his yearly quota on the first business day of the year. Rather than demand equal treatment, Watson says simply, "I was demanded."

When the elder Watson died in 1956 at 82, Watson Jr. was thrust into the lonely role of running IBM. Here he paints a vivid picture of the insecurity of taking over one of the major corporations in the U.S. Ironically, Watson shines here, but you wouldn't know it from the tenor of his words. His self-doubt pervades the entire book.

Nonetheless, Watson forcefully led IBM out of the punch-card era and into computers. He built the company from less than \$500 million in revenue to a \$7.5 billion behemoth, along the way reorganizing and restructuring with such innovation that IBM became the classic business-school case study of how to run a company.

Watson does not take the credit generously to Al Williams, Vic Leander and other key executives, but it is clear that he learned his father's lessons well. In the midst of tremendous growth, he managed to retain IBM's unique first environment. He instituted, for example, innovative and generous benefits, stock options and retirement packages for the work force.

Perhaps the most interesting section for IT readers is the development of the System/360. "It was the biggest, riskiest decision I ever made," he says about pushing the 360 product announcement up far in advance of the time the machine

would be ready. When the system was introduced on April 7, 1964, some of the equipment included wood mock-ups. Though the entire development process put all of IBM through an intensely emotional wringer, the resulting computer changed the industry and brought in billions for IBM.

A heart attack in 1970 caused Watson to retire at age 55. He describes, in too much detail, his sailing adventures and his short, troubled career as U.S. ambassador to the Soviet Union under President Carter. However, he also weaves in his coming to terms with his father in his later years, a sadly touching revelation.

Watson has clearly mellowed since his halcyon days at IBM. He took up heliports at age 62 and continues to still be flying solo around the New York area in his helicopter today. A robust 76, Watson continues with the likes of Soviet President Gorbachev and the nation's Who's Who. His book immediately jumped onto *The New York Times* bestseller list, which proves that despite a decade out of the limelight, Watson is still an intriguing subject to a lot of people. After reading this book, one must wonder what kind of book Tom Sr. would have penned.

GLENN RIFKIN

Rifkin is a Computerworld features editor.

Insurance firms lag behind

BY ALAN J. RYAN
CW STAFF

ATLANTA — The insurance industry, on the whole, has not yet begun to tap the wealth of management and planning resources available through the effective use of information technology.

Those were the findings of a study released earlier this month by Cambridge, Mass., consultancy Arthur D. Little, Inc. based on LOMA (Life Office Management Association), an Atlanta-based insurance industry research, education and information provider.

The results did not come as a surprise to Laurence P. Chait, director and manager of Arthur D. Little's information systems and practice, who authored the report and managed the team that conducted the study.

The study, called "Information Technology: Achieving the Potential," showed that although some companies are making gains using technology, there is a general failure to get complete benefits industry-wide, Chait said.

"That doesn't mean they don't use technology or that the systems don't work, because they do," Chait said. "But if you compare what they might get compared with what they do get, there is a significant gap."

The study consisted of both one-on-one and group interviews with more than 150 IS managers and other senior executives across the insurance industry.

Chait acknowledged that companies can never achieve the full potential of information, because the potential is a moving target. "It keeps growing faster than our companies can assimilate technology's advances and capitalize on them," he wrote in the study.

In the insurance industry in particular, Chait said, many technology applications — "simply automate tasks — fill in the blanks on a claim form faster, for example. Forms are created faster, but then the printed form still moves from one desk to the next."

The report suggested that senior managers use the following four processes to better achieve the potential of today's information technology:

• Understand the technology.

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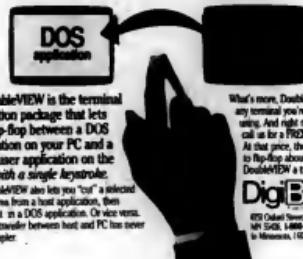
Be involved in information technology planning and management, participating directly and monitoring performance.

Line managers must then follow by having the responsibility of integrating the technology into the fabric of the work they manage, according to Chait.

"Line managers must learn to conceive of information as an asset to exploit, and they must view information technology as capital in which to invest aggressively," he said.

The information technology professional in all of us must play a pivotal role — moving away from the data center and toward strategic business involvement. The IS manager must ensure that support organizations can implement senior executives' visions, establish a group to watch and assimilate new technologies and become directly involved in corporate strategic planning.

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Sun

FROM PAGE 71

lates into not-so-mere power. For the first time in his 13 years at Sun, he says, "I get to have an impact on the way people act who are not computer people. I'm treated as an equal. It's becoming easier to do my job."

The importance of being there has not been lost on Donohoe, who is widely credited as one of the major forces behind

the decentralization of his own department.

"Ownership makes a big difference," he says. "I think you're just talking about human nature."

Unlike some observers of the IS community, Donohoe does not believe that corporate IS will come of age only when the IS director is looked upon as a potential chief executive officer. However, he says, "The IS director does have to be a general manager and be recognized as such

within the company. Being part of the corporate planning team is a powerful position. Being the next stage for us."

Donohoe believes that the wall between systems and corporate will not really be torn down until crossovers occur in both directions.

"Somewhere down the pile, I hope to see not just systems people in the businesses, but business people in systems," he says. The harder it is to tell who's a what, he adds, the easier it is to do what's needed to fuel the company.

It is especially important, both Pacione and Donohoe say, to soften the lines between traditional IS and corporate as the distinctions between the day-to-day necessities of such age-old divisions are vanishing.

"The oil flows across the company," Donohoe says. "There are real business reasons for integrating the way we are."

The bottom line for Sun's IS, and ultimately for the whole company, is the criticality of information — and the need for disposal of the talent and ability to deal with it.

"Hardly anyone at this company ever sees a barrel of oil," Pacione says. "Everything is on a computer screen somewhere."

The blurrier the better

SUN R&D's IS director, Jack Donohoe, would like to see the distinction between information systems people and business folks dim even further than they already have. The more they do, he believes, the better things will run. And the day Donohoe can tick off on his wish list may not be that far down the road.

In the Fuchs division, new manager Mike Pacione is hoping to stage a trial run within the next several months. One of the systems people has been working closely with one of the users in flesh. When the user takes a vacation later this summer, Pacione says, he may move the systems person into the user's job.

"How much value can you add in a week?" he says. If the answer turns out to be as he suspects — none, but you can do a lot of good — Sun can expect to see more such switches.

"People get trapped in their day-to-day jobs and end up not seeing the big picture very well," Pacione says. "It's important to blur the lines."

NEIL MARGOLIS

Services demand to grow

BY SALLY CUSACK
CW STAFF

The demand for systems operations services, including outsourcing of facilities management, will grow from a \$5.9 billion market in 1989 to \$12.8 billion by 1994, according to a recent study by Input, Inc., a research and consulting firm in Mountain View, Calif.

Input broke the market into two categories: processing and

professional services.

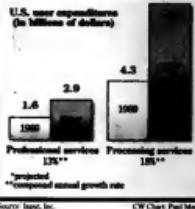
Under the processing services mode, the vendor provides all planning, management and operations services for the client — using vendor-owned equipment. Doug Wilder, manager of systems integration at Input, said this mode of operations is growing at a compound annual rate of 18% and is most prevalent in the commercial sector.

With a compound annual growth rate of 13%, professional services — in which vendor-provided personnel plan, manage and operate client-owned equipment — is most popular in the federal government market, the report said. "The government prefers to own its own equipment, but the commercial markets want to offload the investment," Wilder said.

The report also indicated that the growing need for systems integration services is fueling the move toward outsourcing by establishing confidence in long-term contracts.

Boom time

Demand for systems integration and outsourcing is fueling growth in IS services



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Alan J. Ryan

Too slim to be believed?

A memorable cartoon I once saw had the caption, "I've been wearing a 34-inch waist since high school." The sketch shows an older gentleman wearing his trousers hiked up to just under his armpits and bragging to a friend; meanwhile, his bulging 50-inch waistline is putting the pleats of his pants to a serious stress test.

That cartoon reminds me of some information systems organizations that claim to be, in their terms, "moving toward a flatter organization by eliminating the hierarchical management pyramid."

What they are saying, of course, is that they are trying to eliminate some of the middle layers of management. But until

I really see it happening, I'll still assume that though they claim to be flatter, they are actually giving a 50-inch waist into a 34-inch waistband.

We've all heard the claims of the parent companies that say the term "layoff" is banned from their corporate vocabularies. I hate to be an instigator, but why is it that flattening companies that don't have layoffs seem to experience a rapid rise in attrition?

Am I the only one who has noticed that the same IS chiefs who just a few years back would boast of having only a 5% rate of attrition in their shops now use phrases like, "Through attrition, we were able to eliminate eight midlevel managers over four months?"

And if the attrition rate does not rise, then couldn't one assume that it may conceivably take years to achieve a flatter organization? If that is the case, perhaps companies will learn to get a little more creative to bring about the flat organization they claim they desire.

For instance, IS shops may take all of the midlevel managers aside, issue new business cards and call them all consultants. What a coup! A layer of management has vanished on paper, the organization is flatter as far

as the cataracted eye can see, and the company still retains all of the people who can provide that midlevel management point of view.

Some workers are offered their walking shoes in the form of "early retirement." If the word does not get out that their chances of being hired are slim in these days of flatter organizations, they might actually grab the golden parachute and fly. At

least they will be out of your hair.

A third alternative is to spin off divisions and/or groups at the rate of one or two per month — thereby creating a home and an important-sounding title for a midlevel manager without having to hike salary levels.

An assistant director of systems development might become vice-president of systems development for the corporate

headquarters staff; a programming team leader might become "senior vice-president of Cobol programming," and a director of PC training might become "vice-president/training, corporate systems group."

So, keep hiking those trellises up. No one will notice, really.

Ryan is a *Computerworld* senior writer.

MANAGEMENT BRIEFS

ASM lines up new 1990-91 slate of officers

The Association for Systems Management (ASM) has announced its slate of international officers for the 1990-91 year.

Newly elected officials of the association, which represents 8,000 information systems managers, analysts and consultants internationally, were installed earlier this month. President is Scott J. Boltz, manager of Extended Systems, Inc., in Boise, Idaho, is president of the Idaho/Intermountain chapter of ASM.

President-elect is Paul R. Saunders of the Nashville chapter. He is also president of Saunders Systems Corp. in Nashville.

Vice-president is Linda J.

Menard-Watt of the Sun Parlor chapter, who is manager of administration information systems at the University of Windsor in Windsor, Ontario. Treasurer is William D. Munch of the East Bay chapter. He is IS consultant in Pleasant Hills, Calif.

The new secretary is Ross A. Flaherty of the Fort Worth chapter. Flaherty is director of information resources management and the Microcomputer Resource Center at Texas Wesleyan University in Fort Worth.

Nominations are due by Aug. 1 for the Professionalism in Service Management Award, presented by AFSM International in conjunction with the Data Group.

Winners of the award, which was created in 1986 to honor service managers whose professional and personal activities have "done the most to increase the professional image of managers in the high-technology services industry," will be notified by Sept. 15. The award will be presented at the 16th AFM International World Conference to be held Sept. 30-Oct. 3 in Rosemont, Ill.

For more information and nomination forms, contact AFM International in Fort Myers, Fla., (800) 333-9766.

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CALENDAR

Consulting skills, communicating effectively with information systems clients, leadership, end-user computer support and marketing the IS organization internally are some of the topics that will be covered at the 5th annual Ouellette & Associates Summer Workshops to be held Aug. 20-23 in Nashua, N.H.

The theme of the conference will be "Developing the Human Side of Technology." NBC News correspondent Irving R. Levine will be the keynote speaker. For more information, contact Ouellette & Associates at (603) 623-7373.

JULY 8-14

— Contact: APICS, P.O. Box 344, Falls Church, Va. (703) 297-4344.

Information Center Conference & Exposition. San Francisco, July 8-12 — Contact: Waggoner Publications, Boston, Mass. (617) 548-8146.

American Production and Inventory Control Society Seminar and Exhibitions. San Francisco, July 8-11

Software Engineering Strategies Conference. Worcester, R.I., July 8-11 — Contact: Ashley Peacock Group, Stamford, Conn. (203) 967-4751.

Harry Micro '90 Conference. San Diego, July 9-13 — Contact: Harry, San Diego, Calif. (619) 545-8645.

Consulting Skills for the Information Processing Professional. Los Angeles, July 10-11 — Contact: Ouellette & Associates, Bedford, N.H. (603) 623-7373.

Information Networking Technologies & Applications. Washington, D.C., July 10-12 — Contact: Ms. Schenck, Bell Atlantic Educational Services, Princeton, N.J. (908) 327-8412.

Service and Quality: Transforming the Value Into Reality. St. Louis, July 13-15 — Contact: Diane Stage, Washington University, St. Louis, Mo. (314) 889-4556.

Association of College and University Telecommunications Administrators Annual Conference and Exhibit. Orlando, Fla., July 15-18 — Contact: Lee McLennan, ACTTA, Longview, Ky. (606) 232-2862.

Managing Quality Function Deployment. Dallas, July 16-17 — Contact: Technilog Training, Terre Haute, Ind. (812) 534-3932.

BID '90 in the International Marketplace. San Francisco, July 16-18 — Contact: International Congress Registrar, Alexandria, Va. (703) 838-8042.

Engineering Workshops Conference. Boston, July 16-18 — Contact: EMC, Santa Monica, Calif. (310) 450-6666.

Industrial and Engineering Applications of Artificial Intelligence and Expert Systems. Charlotte, S.C., July 16-18 — Contact: Dr. Morris A.B. University of Tennessee Space Institute, Tennessee, Tenn. (423) 452-6551.

Telephone Network Overview. Cincinnati, July 17-18 — Contact: CEC Networks Technologies, Cincinnati, Ohio. (513) 543-4477.

Database World Conference & Exposition. San Jose, Calif., July 17-18 — Contact: Digital Consulting, Arden Hills, Minn. (617) 296-0441.

Manufacturing/NY Conference & Exposition. New York, July 17-18 — Contact: Expansion Management, White Plains, N.Y. (914) 273-0441.

Developing Procedures, Policies and Documents. Somers, N.Y., July 17-20 — Contact: Information Mapping, Somers Division, White Plains, N.Y. (914) 895-7063.

Midwest/Mid-Atlantic Networking Using PCs, Modems and Mathematics over Local- and Wide-Area Networks. San Francisco, July 17-20 — Contact: Learning Tree International, Los Angeles, Calif. (800) 421-8104.

NAFIS Outcomes: An In-Brief Examination. Santa Clara, Calif., July 18-20 — Contact: J2 Software, Santa Clara, Calif. (408) 258-4300.

Satellite Design, Manufacture, Regional Conferences. Sacramento, Calif., July 19-20 — Contact: James Lee, SUG, Pac. Net, Calif. (415) 256-0544.

JULY 22-28

North American Conference of International Business Schools Computer Users Group Meeting. Omaha, Neb., July 23-25 — Contact: Sal Hansen, College of Business Administration, University of Nebraska, Omaha, Neb. (402) 554-2816.

GUIDE '90 Convention of Midsize and Large-Scale IBM Systems Users Group. Chicago, Ill. (312) 644-6616.

THE CAMAP Show for Computer-Aided Graphics, Multimedia and Presentations. Chicago, Ill. (312) 527-2327 — Contact: Knowledge Industry Publications, White Plains, N.Y. (914) 328-9157.

Multimed Expo '90. Houston, Texas (713) 877-8030.

Utah State University IT Institutes. Logan, Utah, July 25-26 — Contact: Monique Snyder, Logan, Utah (801) 750-1990.

Knowledge Acquisition & Engineering Conference. Cambridge, Mass., July 26-27 — Contact: International Business Communications, South Natick, Mass. (508) 866-4700.

Marketing the IT Organization Internally. Chicago, Ill. (312) 527-2327 — Contact: Ouellette & Associates, Bedford, N.H. (603) 623-7273.

JULY 29-AUGUST 4

AI-1990 Conference. Boston, July 30-Aug. 3 — Contact: Americas Association for Artificial Intelligence, Meds Park, Calif. (415) 258-3128.

Insourcing vs. Outsourcing: The Benefit Meeting. Atlantic City, July 31-Aug. 1 — Contact: The Task Group, Boston, Mass. (617) 267-1000.

Computer Security in the '90s Conference and Symposium. Boston, Aug. 1-3 — Contact: Intercon, Atlanta, Ga. (404) 543-0548.

Software Measurement and Reference Seminar. Boston, Aug. 3-5 — Contact: Digital Consulting, Arden Hills, Minn. (612) 470-3886.

Breakthrough Manufacturing & Upgrading PCs Seminar. San Antonio, Aug. 3-5 — Contact: Qwest, Springfield, N.J. (201) 253-3227.

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Not everyone is out to set a speed record

BY ALAN RADDING

Many people hear about the power of an Intel Corp. 486-based personal computer and ask "why?" For others, the response is closer to a "why not?" or even "how much?" A lot of corporate buyers view the 486 as merely a much faster version of the Intel 80386-based machine. Whereas the 386 took desktop computing from 16- to 32-bit capabilities, the 486 is very similar in architecture to its predecessor. It uses the same basic instruction set as the 386, but it outperforms the 386 and delivers better price/performance through the physical integration of the math coprocessor and cache on the same chip as the CPU. According to some figures, a 25-MHz 486 performs two to four times faster than a 33-MHz 386, depending on the application and a number of system design and implementation features.

Speed issues get more yawns than praise from many corporate microcomputer managers — at least until there is software and an operating system that can take advantage of its power.

"Last year, people wanted to talk about the differences between the 286 and the 386. But with the 486, there's nothing [new] to discuss," says Roger Bender, vice-president of Citibank NA's investment banking division in New York and president of the New York Micro-managers Association.

In addition, these managers ask, who needs all that power?

The "why-not?" segment of the market may be inclined to agree that it doesn't need the power today, but these managers figure that the 486 will come in handy for future needs.

Ed Bussman is a member of this group. At Commonwealth Edison's LaSalle County Station, a nuclear power plant just outside of Marseilles, Ill., Bussman is building his company's first PC network. For the server compo-

nent, he is evaluating several 486-based PCs, including one from AST Research, Inc. "A 386 would probably do the job, but I don't know why anybody who ever bought too much computer," says Bussman, PC administrator at the firm. "We may not [take full advantage of] the 486 today, but a year or two years from now . . . well, these things always snowball."

Speed demons
The real enthusiasts — those excited about the new speed threshold — are people frustrated with DOS applications that run slowly even on high-end 386s. These buyers are using the machines as supercharged 286s and 386s and finding them handy for large databases.

Steve Geier, associate director in the finance department at New York Telephone, couldn't wait to see how the 486 would handle his very large financial modeling application that ran on

a 200MB-byte database. Formerly a Compaq Computer Corp. and AST user, Geier shopped around for a 486-based computer and settled on a machine from Digital Distributing, a vendor that was just entering the market.

When Geier saw runtime de-

crease from 33 to 21 hours, he ordered two more 486s for other large financial models.

At Wilson Jones Co., a Chicago-based office products marketer, Richard Lange knew he wanted a 486 machine to take sales data from the mainframe and create tables and reports for marketing personnel. Although the company is traditionally IBM-oriented, Lange chose a Compaq Desklpro 486 for its performance capability and reduced the application's runtime from 1½ days to a few hours. "Everyone is hungry to get the information as quickly as possible," says Lange, an information systems manager at the company.

Computer-aided design users

who have 4M- and 8M-byte files don't give the 486 a second thought. Wiley Ham Pacific, an engineering firm based in Bellevue, Wash., has already purchased three Hewlett-Packard Co. 25-MHz Vectra 486 machines. Wiley Ham still relies mainly on its 25-MHz 386s, also from HP, but it creates its larger Autocad drawings on the 486s.

"The size of our drawings keeps getting larger, so we wanted the fastest thing we could get," says Mike Gibbons, a computer systems manager.

"We're using a 33-MHz 386 PC now, but we've ordered a 486," says Nolan Walker, managing director at Varitech in Beaumont, Texas, a subsidiary of Gulf States Utilities. "I don't know what the difference will be yet, but I want to find out."

For to go

However, while the power-hungry are buying 486-based machines, these PCs are far from becoming a corporate standard.

Compared with Intel's 286, 386 and even 8080 and 8086 PCs, the 486 will lag far behind in units shipped for several years. In 1989, only a few hundred thousand 486 machines were sold, compared with two million 386 machines and 5.3 million 286 PCs, says David Cearley, program director at Gartner Group, Inc., a market



INSIDE

Power

To Awaken

Only a 32-bit OS can unlock the riches of the 486. Page 83.

Product

Guide

A list of 486-based PCs out now or shipping soon. Page 93.

Which Way

Is Up?

There's more than one way to upgrade to higher power. Page 88.

Radding is a free-lance writer based in Newton, Mass.



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Speed

FROM PREVIOUS PAGE

research firm in Stamford, Conn.

Carey says he expects the 486 to continue growing in popularity, reaching 4.6 million units sold in 1991 and 7.6 million in 1992. On the other hand, unit sales of the 386 are expected to grow to 300,000 in 1990, 600,000 by 1991 and 1.1 million in 1992.

Within the Fortune 500, companies are not rushing into any purchases, according to The Sierra Group, Inc., a market re-

search especially in an area as important as file serving," Bender says.

Instead, companies are more likely to install something that has already demonstrated some success, he explains.

Another problem is that the 486 chip does not address the major bottleneck in LAN file-serving applications: the operating system and the hard disk I/O.

"There's no difference when you're a 486 as a file server. You're already limited by the bandwidth of the token-ring network," says Art Block, vice-president of end-user application support at Manufacturers

Standard, a few things have to happen: Price need to come down, and a new operating system, applications software and bus peripherals need to appear.

While 486-based machines are not a huge jump in cost above a 386-based machine and actually well in price/performance, they are generally still above the level that is acceptable to corporate buyers.

"They have to get below the \$5,000 threshold before corporate buyers will start buying them," says Leslie Piering, an analyst at Gartner Group, Inc.

A major constraint for the 486 is that neither DOS nor OS/2 at its current stage of development can tap the processor's potential. In fact, there is still very little software that takes full advantage of the expanded instruction set or 32-bit architecture of the 386, never mind the 486.

"People are still running applications [on the 486] that were written for their ATAs and even the original 8086/86 PCs," says Phil Magney, director of sales and marketing at ARS/Workstation Laboratories, a technology research firm in Irving, Texas.

Bit key hit

While Unix takes advantage of 32 bits, few PC users are willing to venture into that environment. It has been promised that OS/2 Extended Edition will take full advantage of the 486, but OS/2 Extended does not yet exist, and no one knows how far behind it applications might be.

"If you're buying a 486 to run OS/2 Extended Edition, OK — but if you're buying OS/2 to run DOS applications, there's no point in buying OS/2," says Tom Nolle, president of CIMI Corp., a technology assessment firm in Vorhees, N.J.

White Nolle usually steers his
Continued on page 24

search firm in Tempe, Ariz. While 70% say they plan to evaluate the 486, they say they wouldn't make any purchases for about 12 to 18 months or until prices go down. Even when they do purchase 486s, Fortune 500 companies aren't eyeing large-scale purchases for the desktop. They say they will position the machines as local-area network file servers or engineering workstations for computer-aided design, graphics and statistical analysis.

The server area hasn't quite caught on, however. The newness of the 486 discourages some companies from implementing it. "There is no reason to go with Release 1 of anything,

Hanover Corp.

The difference, he says, comes when you use a 486 as an application server, where it is called on to perform application processing as well as simple file serving. Manufacturers Hanover is poised to do just that with its Lotus Development Corp. Notes application, which is set up to operate in a full client/server capacity.

"The server must perform Notes computations on behalf of many clients," Block explains. As such, it does more than simple file serving and, therefore, needs more processing horsepower.

Before the pendulum swings to the 486 as the corporate stan-

Number of units shipped (thousands)

	1989*	1990*	1991*	1992*	1993*	1994*
1486	25 MHz	10,000	400,000	1,13M	700,000	500,000
33 MHz	0	10,000	400,000	1,13M	1,5M	1,5M
Total 486/586	0	0	10,000	400,000	1,13M	1,5M
				1.5M	2.2M	3.8M

*Projected

Continued on page 24

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Continued from page 63

clients away from the 486 because of the limitations of DOS and the lack of applications for OS/2, he concludes that "the 486 is probably a smarter buy over a high-end 386, as long as you realize that there will be limited benefits."

For clients who really want the full advantages of the 486, such as true multitasking and multivector functionality, Nolle suggests that "it is time to start asking about alternative operating systems," such as Unix. "The time is going to come when you don't want to stay in DOS."

Similarly, while many users run their 486-based PCs with the standard AT — or Industry Standard Architecture (ISA) — bus, "you really need a higher performance bus to support a higher performance system," Magney says.

Currently, 52% of 486 users run the ISA bus, 23% use IBM's Micro Channel Architecture (MCA) and 25% use Extended Industry Standard Architecture (EISA), says John Dunkle, vice-president of Workgroup Technologies in Hampton, N.H. By 1993, he predicts, only 7% will use the ISA bus, with 58% opting for MCA and 35% for EISA. If EISA boards become available in volume sooner, Dunkle

notes, it will alter the 1993 projections, but the overall trend will remain the same — the 486 eventually will drive users to use new bus architectures.

Some buyers say that, at least in terms of their current needs, the bus issue is irrelevant. "We have an EISA machine, but we

tend to use the company's base of Personal System/2 machines, but he resisted.

Others, however, are coming close to hitting the wall with the limited capabilities of the ISA bus. "We're getting to the point where the bus is the limiting factor," Citibank's Bender says.

It is actually not that great between a 33-MHz 386 machine and a 25-MHz 486. Buyers can pay up to \$19,000, if they want a fully configured name-brand 486 PC, complete with extra cache and other bells and whistles. But a shopper who is willing to accept less-known brands can get a similarly configured 25-MHz 486-based machine for a little more than \$5,000 through direct marketers.

When New York Telephone's Geier purchased his 486, he found "a very attractive price" from Digital Distributing. "The big vendors were too expensive. Digital Distributing was cheaper and had better performance," he says.

Manufacturers Hanover was paying about \$7,500, on average, for a 386-based file server with 8MB bytes of memory and a 325MB-byte hard disk. For about 10% more (\$8,200), the company purchased a 486-based file server from AST.

"What I'm spending hasn't really changed, but I'm getting more for the money," Block says.

The cost of the 33-MHz 386 is likely to drop; however, many observers expect the differential to remain slight.

Some argue that users who turn to lower priced 486-based

machines from new, unproven vendors risk being left in the lurch when it comes to support.

Some observers attribute the difference in price to differences in the quality of components. Higher priced machines also come with 330MB-byte hard drives, compared with 200MB-byte drives, and an EISA or MCA bus rather than an ISA. Even when the less expensive 486-based PCs provide an EISA bus, they do not support all the bus master modes, Nolle adds.

Which direction?

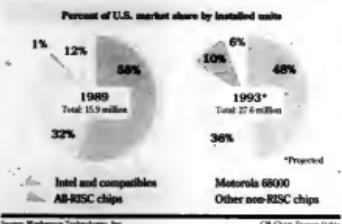
While some experts counsel users to wait for issues such as the operating system and bus master to clear, others dismiss the notion of waiting in the rapidly changing PC market. "New equipment is always going to come out that will be faster," Block says.

Others prefer to wait. "I won't do anything with a 25-MHz PC, not when 33-MHz and 50-MHz machines are coming fast," Bender says.

What users have to remember is that the premium you pay today buys you a short-lived advantage, with higher clock speeds such as 50 MHz expected this fall, not to mention the 586, 686 and 786 chips due out by the year 2000. *

Coming up on the outside

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don't have any EISA cards in it," says Wilson Jones' Lange. The company uses two ISA cards — an IBM 3270 emulation card and a Token-Ring card — in its 486. Lange was under pressure to go with MCA for the sake of consistency.

"By the time we get to 50 MHz, the bus can limit performance. The ISA will choke a 486."

While corporate purchasers balk at standardizing on the 486, for niche users who want the power now, the price differen-

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Cache-ing in on 486 chips

BY DAVID CLAIBORNE

Systems developers are used to reducing numbers on price tags, not on feature descriptions. So when Intel Corp. announced its 486 chip with 8K bytes of internal cache — after people were used to hearing about the 80386's 32K bytes of external cache capability — many of the hardware questioners questioned the wisdom of the move and felt compelled to compensate.

Of the vendors shipping 486-based machines in the next six months, about two-thirds have added external cache to their machines. Whether a buyer wants 64K bytes, 128K bytes or extra cache at all is now a subject for debate.

One firm that tested both approaches before developing its Vectra 486 and decided that Intel probably knew best is Hewlett-Packard Co. Not only is it more expensive to design exter-

nal cache, but performance improvements were marginal, according to Mark Koski, 486 product manager. Other trials bear out HP's conclusion.

On the other hand, Advanced Logic Research, Inc. (ALR) is of two minds on the matter... believing that while individual users working on a stand-alone 25-MHz machine probably do not need external cache, power users and file server applications do.

For that reason, says David Kirkey, vice-president of marketing and international sales, ALR leaves the decision up to the buyer. Its Businessview 486 has no other external cache, while the Powerview, Power/E and Power/4 all offer it. "If the user's needs change," Kirkey adds, "a 64K-byte cache can be added for \$600."

Intel itself says 8K bytes is just fine. According to the firm's published estimates, the "hit rate" — or the percentage of

times the on-board cache contains the requested data — is 96% with DOS applications and 92% in multitasking operations.

The chip uses a four-way set-associative cache with a 16-byte line. This means that main memory is brought in 128 bits at a time, four times as fast as from the earlier 80385 controller. This reduces cache misses in consecutive data reads.

In addition, the cache is effectively split into four 2K-byte components, improving the performance when jumps are made between blocks of main memory. It is as if you needed to find a reference in a book and could look in four places at once.

What is becoming apparent, however, is that with higher clock speeds on the horizon, external cache will become more valuable. As processor speed increases, so does the severity of the penalty for a cache miss. At 25 MHz and a cycle time of 40 nsec, a cache miss requires four extra cycles to retrieve information from main memory.

At 33 MHz, with a cycle time

of 30 nsec, that number may double to eight extra cycles. Although the hit rate remains the same, the penalty in terms of lost clock cycles and amount of idle processor time doubles.

Possibly in response to this — and coinciding with the 33-MHz version of the 486 chip — Intel has announced the TurboCache 1486. This module provides a system with 64K or 128K bytes of external cache and uses the new 82485 cache controller to provide a two-way set-associative write-through implementation that works in

conjunction with the 486's internal cache. The TurboCache 1486 will be available in 25- and 33-MHz versions and will range in price from \$250 to \$450.

Intel predicts that the TurboCache will improve performance up to 15% in 1486-based systems. According to Bill Rauh, Intel's 386/486 microprocessor focus group director in Santa Clara, Calif., "Applications software written for MS-DOS, Windows, OS/2 and Unix operating systems will continue to become more complex and benefit from a second-level cache."

Write-back soon

Advanced Logic Research and Arche Technologies use a write-back rather than Intel Corp.'s write-through caching scheme on their models with external cache.

On Intel chips, all writes to memory are written to the cache and then through to main memory. While this approach is very reliable, it can also bog down performance. When the processor is operating under a heavy load, such as a multitimer/tasking environment, the memory bus is consumed primarily with write operations.

The write-back scheme is particularly beneficial in multitasking operations. In this approach, memory changes are made to the cache, and the main memory is updated only when the cache is to be flushed by new information that is coming in. While the vendors claim this speeds performance, there is a small chance that the main memory will fail to be updated.

DAVID CLAIBORNE

Claiborne is a consultant in Highland, Md.

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The 386 upgrade path is viable but tricky

BY DAVID S. VEALE

Even people in search of speed may want to ease slowly into Intel Corp.'s 486 functionality. With prices declining on 33-MHz Intel 80386-based systems, some buyers may prefer investing in these machines now and then upgrading later — or they may choose one of the "upgradable" 386s now being offered.

There are cautions along the upgrade path, however. The more leisurely pace may disqualify buyers from achieving full 486 functionality, not to mention causing them to spend more than they meant to or taking a partial loss on their 386 investment.

One method of upgrading is with a board that contains a 486 chip. The board attaches via cables to the 386 processor and 80387 math coprocessor socket after the chips are removed.

For many buyers, this option makes a lot of sense. A fast 386 may be all they need for the time being, and there are certainly far more price-competitive vendors from which to choose. In addition, by the time users complete the upgrade, the boards will most likely have come down in price.

In the end, however, this route may not always be economically practical. The reasons have to do with the architecture of the chips themselves.

While the instruction set and operating modes of the 486 are identical to those of the 386, the 486 has a built-in floating-point unit and 8K-byte memory cache and cache controller. On 386 PCs, these features are available only with the addition of the 387 chip, cache memory and the memory cache controller chip.

When the upgrade occurs, these chips are no longer needed, resulting in a wasted investment. In the case of the 387, this can be a loss of \$450 to \$575.

In addition, any external cache you al-

ready have on the 386 machine will be incompatible with the 486. While the 486 will usually ignore the existing external cache system entirely, this is nevertheless a waste of a potential performance enhancer. It also means that another premium-priced component of the existing system is wasted.

If you choose this upgrade route, you increase only processor efficiency, not clock speed. Thus, if you want to eventually have the equivalent of a 25-MHz 486, you need to start with a 25-MHz 386-

based system.

If you put a 486 chip into a 386 machine with a slower clock speed, the new processor will be too fast for existing components. The computer will not boot properly, and even if it does, it will probably crash.

Strange behavior

One last problem you may encounter is some strange behavior from existing devices because of timing changes.

When a manufacturer of video cards

upgraded its 25-MHz 386 to a 486 machine, the processor changed the system timing in such a way that it adversely affected the video performance of the machine, resulting in a 30% drop in overall performance.

Timing problems should not be an issue much longer, as peripheral manufacturers can modify the design of their products to accommodate 486-specific issues.

The other way to upgrade is to choose an upgradable machine, such as Compaq Computer Corp.'s Systempro, IBM's Personal System/2 Model 70, AST Research, Inc.'s Premium and Advanced Logic Research, Inc.'s Powerwave. These machines come with a 386 processor that can be replaced with a 486.

Some, such as the Systempro, are also

1990. The missing north of New York.



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Low money down

In some firms, it may make more economic sense to buy relatively low-priced Intel 80386-based machines and replace them with Intel 486s when needed, says Ben Myers, a consultant at Spirit of Performance, Inc., in Harvard, Mass. The 386 can then be passed on to an employee who has outgrown his Intel 8086- or 80286-based system.

With some 386 machines now hovering near the \$2,000 mark, this strategy may make a lot of sense. Northgate, a maker of mid-range high-performance PCs, sells a 25-MHz, 486-based computer for \$5,895 with 4MB bytes of memory and a 200MB-byte hard disk. A company could buy such a machine and an off-brand 386 system for less than the price of one 486-upgraded AST Premium.

DAVID S. VEALE

designed to support multiple 386 or 486 processors.

With these upgradable machines, the upgrade is simple and, unlike third-party upgrades, is supported by the vendor. In addition, you can increase both clock speed and processing speed.

Costly configuration

While some of these upgradable systems provide a growth path, their very configuration can make that path expensive.

Many of the manufacturers put the processor and at least some of the memory on an expansion card, not on the system board, as in more standard systems. The expansion board is removable and replaceable, but only with a board produced by the manufacturer.

In addition, there is the question of what to do with the 386 card, which will work only in the make and model of the original machine.

With the exception of the PS/2 Model 70, there is a premium to be paid for buying a 386-based system now and upgrading later. ALR's Powerwave 33-MHz 386 machine has a base price of about \$3,500. The 386 processor card can be replaced with a 25-MHz 486 card for \$1,995 (including a \$200 credit for returning your 386 card). The entire procedure ends up being about \$1,500 more expensive than initially buying the 486 version of the machine.

At \$3,195, a 33-MHz upgrade costs substantially more. AST's path is even more expensive. The Premium comes

with a 16-MHz 80386SX on an expansion card for about \$2,700 — with no hard disk.

The 25-MHz 486 upgrade card costs a whopping \$7,695. A 33-MHz 486 upgrade adds up to \$4,195, which is about \$3,500 more expensive than buying the 33-MHz 486 AST Premium in the first place.

The one bargain here is the PS/2 Model 70. The 25-MHz 386 version sells for about \$9,000, which includes a 120M-byte hard disk. The 486 upgrade costs \$3,500, bringing the system's price to \$12,500. An equivalent Model 70 with a 486 costs \$13,000. ■

Vane is the PC coordinator for IDG Communications/Peterborough, Inc.

ASK THE VENDOR

We recently started using the Micro Frame 486SL board, which has just eight slots. Is there any way we can increase the number of slots?

Gerry Archibald
President
SBS Datatech
Denver

MONOLITHIC SYSTEMS CORP.: One, you could move to the Micro Frame 486 EX, a 14-slot Intel 486-based EISA motherboard, which accepts AT-style boards. Or you could keep using the eight-slot board but free up some of the slots by installing the Micro Prog 452 VGA multifunction card. It consolidates functions that normally would take up three separate slots.

We have a Compaq Computer Corp. 386/35 server running SCO Unix connected to 40 workstations with Corollary's 8 x 4 multiprocessor subsystem. How difficult would it be to convert to a multiprocessing system?

David Taylor
Planning Program Coordinator
Department of Planning
Tucson, Ariz.

COROLLARY, INC.: The multiprocessor version of SCO Unix — called SCO MPX — was designed by Corollary to be 100% compatible with the single-processor version of SCO Unix. Compatibility is preserved for the device drivers, applications, data and file systems.

We use Microway's NDP Fortran 386 compiler and have a 486 version on order. What is the difference between the 386, 1486 and 1686 compilers?

James Cutler
Operations Manager
Dynamic Matrix Control Corp.
Houston

MICROWAY, INC.: Microway's 1686 compiler can be used as a 386 compiler and numeric compiler with a proprietary tool chain (assembler, linker, loader, editor, debugger), which generates standard COFF formatted files. You need a DOS extender to run the compiler.

Intel's 80386 or 486 compilers are native compilers that support multiple tool chains. Plus Lap Software, Inc. and Intel OMF files are supported, and a DOS extender is needed to run the application.

The 1686 numeric coprocessor supports multiple operations on a single chip. You would need an Intel 80387 or a Weitek 3167/4167 to achieve the same functionality on the 386 and 1486, respectively.

The 1686 is up to 300% faster than the 386 and 1486 in selected numeric-intensive applications. But in terms of price, the 386 or 1486 plus numeric coprocessor solution is about one-third that of the 1686.



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server with major standards like TCP/IP. It also uses the standard NetWare client software and Novell's SPX/NetBIOS Protocol, so it integrates easily with existing Novell LANs. It lets users access across applications. And, Data General offers a Software Developer's Kit to facilitate the development of client-server applications.

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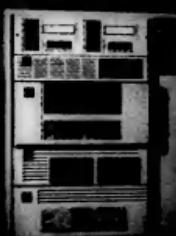
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486-based machines

"[486-chip already has a built-in coprocessor.

The 14.8M chip includes 8K of on-chip cache.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

HIGH-PERFORMANCE PCs
PRODUCT SPOTLIGHT

COMPANY	PRODUCT NAME	CLOCK SPEED (MHz)	OPERATING SYSTEMS SUPPORTED	PROCESSOR ARCHITURE	COPROCESSOR SUPPORT?	MEMORY CACHE?	CACHE CONTROLLER	RAM: STANDARD/MAXIMUM	FLOPPY DRIVE	HARD DRIVE: STANDARD/maximum	CONTROLLER	STORAGE BAYS: HALF HEIGHT/ FULL HEIGHT	GRAPHICS STANDARD	NUMBER OF SERIAL/ PARALLEL PORTS	NUMBER AND TYPE OF EXPANSION SLOTS	DIMENSIONS (in.)	PRICE
AZT Research, Inc. (714) 737-4141	Power 32 MicroVME Model 1	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	Intel 486DX 486DX2 486DX3 486DX4 486DX5	N/A	8K, on- board cache (1.25MB)	Proprietary	486/16MHz One 32-bit 3.2MB	None	IDE	None	0/0	Server 16-bit EISA, three PCI slots	34.25 x 14 x 27.0	\$1,395		
Proxima MicroVME Model 400, Model 400L Model 1000	Proxima 3.3, 4.01, OS/2, Unix, Xenix	33	DOS 3.3, 4.01, OS/2, Unix, Xenix	Intel 486DX 486DX2 486DX3 486DX4 486DX5	N/A, on- board cache (1.25MB)	Proprietary	486/16MHz One 32-bit 3.2MB	320MB, 640MB, SCSI	IDE	None	0/0	Server 16-bit EISA, three PCI slots	34.25 x 14 x 27.0	\$17,995 (\$20M) \$17,995 (\$40M) \$18,995 (\$120)			
Blackhawk Computer Systems, Inc. (415) 779-0300	Blackhawk	25	DOS 4.01	Intel 486DX 486DX2 486DX3 486DX4 486DX5	N/A, 8K, on- board cache (1.25MB)	Proprietary	486/16MHz One 32-bit 3.2MB	150MHz/70MHz IDE, SCSI	IDE	None	0/0	Server 16-bit EISA, three PCI slots	34.25 x 14 x 27.0	\$17,995 (\$20M) \$17,995 (\$40M) \$18,995 (\$120)			
Star Design Computers (800) 343-0433	HDG 400-25	25	DOS 3.3, 4.01	Intel	Built-in 440BX	IDE, 120MHz	Intel-chipset	168/16MHz One 32-bit 3.2MB	500MB, UltraDMA IDE	IDE	4/0	Parallel ATA, SCSI	2/1	Two 16-bit PCI slots, one VGA port	7 x 18 x 14	\$3,995 (\$40M)	
C* Micro Systems (415) 683-0888	C* 486L	25	DOS 4.01	Intel	Worldwide 486DX 486DX2 486DX3 486DX4 486DX5	N/A, Internal cache (1.25MB), on- board cache (1.25MB)	Internal cache controller	270/33MHz One 32-bit 3.2MB	440MHz/515MHz IDE	IDE	5/0	None	2/1	EISA 16-bit VGA port	6.5 x 10.5 x 11	\$3,495 (\$40M)	
Cache Computers, Inc. (415) 228-9922	Cache 486- PC/AT/XT 486/25	25	DOS 3.3, 4.01, OS/2, Unix	Intel 486DX 486DX2 486DX3 486DX4 486DX5	N/A, built-in cache (1.25MB), on- board cache (1.25MB)	Proprietary	486/16MHz One 32-bit 3.2MB	110MHz/70MHz IDE	IDE	4/2	Two 16-bit PCI slots	2.5 x 7 x 16	\$3,995 (\$40M)				
U.S. Custom Computer Systems, Inc. (800) 729-0782	CCS 486-25 Series V/XVII	25	DOS 4.01	Intel	Worldwide 4337	8K, 128K	Proprietary	486/33MHz One 32-bit 3.2MB	212MHz/50MHz IDE, SCSI	IDE	12/0	VGA	2/0	One 16-bit PCI slot, two PCI slots	31 x 10 x 20	\$10,995 (\$21M)	
Chasek International, (314) 787-0862, (314) 787-0863	Chasek Gold 433	25	DOS 5.0	Intel	Built-in 4337	N/A	Internal-cache only	680/16MHz One 32-bit 3.2MB	600MHz/1.2G IDE, SCSI	IDE	4/0	Parallel ATA, SCSI	2/0	One 16-bit PCI slot	24 x 7.5 x 23.5	\$3,995 (\$40M) \$4,395 (\$40M)	
Club America Technologies, Inc. (415) 623-6600	Horizon II	25	DOS 3.3, 4.01, OS/2, Unix	Intel	Worldwide 4337, built- in cache 440BX	N/A, 4K, on- board cache (1.25MB)	Proprietary	486/16MHz One 32-bit 3.2MB	71MHz/42MHz IDE	IDE	4/0	VGA	2/1	One 16-bit PCI slot, one PCI slot, one VGA port	25 x 7.5 x 19.5	\$4,495 (\$40M)	
Horizon II	Horizon II	25	DOS 3.3, 4.01, OS/2, Unix	Intel	Worldwide 4337, built- in cache 440BX	N/A, 4K, on- board cache (1.25MB)	Proprietary	486/16MHz One 32-bit 3.2MB	71MHz/42MHz IDE	IDE	4/0	VGA	2/1	One 16-bit PCI slot, one PCI slot, one VGA port	25 x 7.5 x 19.5	\$7,995 (\$13M)	
Compaq Computer Corp. (713) 294-0616	DesignJet 486/25 Model 125	25	DOS 3.3, 4.01, OS/2	Intel	Intel 486DX 486DX2 486DX3 486DX4 486DX5	N/A	Proprietary	486/25MHz One 32-bit 3.2MB	120MHz Integrated	4/0, 1/1 height	VGA	1/1	One 25-MHz PCI slot, one PCI slot, one VGA port	6.5 x 23.2 x 17.7	\$13,995 (\$20M)		
DesignJet 486/25 Model 220	DesignJet 486/25 Model 220	25	DOS 3.3, 4.01, OS/2	Intel	Intel 486DX 486DX2 486DX3 486DX4 486DX5	N/A, 128K	Proprietary	486/25MHz One 32-bit 3.2MB	320MHz IDE	4/0, 1/1 height	VGA	1/1	One 25-MHz PCI slot, one PCI slot, one VGA port	6.5 x 23.2 x 17.7	\$17,495 (\$20M)		
DesignJet 486/25 Model 400	DesignJet 486/25 Model 400	25	DOS 3.3, 4.01, OS/2	Intel	Intel 486DX 486DX2 486DX3 486DX4 486DX5	N/A	Proprietary	486/25MHz One 32-bit 3.2MB	450MHz IDE	4/0, 1/1 height	VGA	1/1	One 25-MHz PCI slot, one PCI slot, one VGA port	4.5 x 23.2 x 17.7	\$21,495 (\$20M)		
Compaq Computer Corp. (404) 311-2116	Compaq 486/25	25	DOS 4.01, OS/2, Windows 3.0	Intel	Worldwide 4337	N/A	Internal-cache only	486/25MHz One 32-bit 3.2MB	650MHz IDE	IDE	3/0	VGA	2/1	Two 16-bit PCI slots, four PCI slots	4.5 x 23.2 x 25.5	\$4,995 (\$10M)	
Compaq U.S.A., Inc. (101) 823-0011	PC 486/25	25	DOS 3.3, 4.01	Intel	Worldwide 4337	N/A	Internal-cache only	486/25MHz One 32-bit 3.2MB	650MHz IDE	IDE	3/0	Optimized VGA	2/1	One 16-bit PCI slot, one PCI slot	6.5 x 23.2 x 25.5	\$4,995 (\$10M)	
CSB Laboratories (714) 853-8181	Max Sys 486/25	25	DOS 3.3, 4.01, OS/2	Intel	Socket for Worldwide 4337, built- in cache 440BX	N/A	Internal-cache only	486/25MHz One 32-bit 3.2MB	100MHz/1.2G IDE, SCSI optional	IDE	3/0	Two 8-bit right-angle PCI slots, two PCI slots	25.5 x 7.5 x 24.5	\$6,995 (\$10M)			
Max Sys 486/25	Max Sys 486/25	25	DOS 3.3, 4.01, OS/2	Intel	Socket for Worldwide 4337, built- in cache 440BX	N/A	Internal-cache only	486/25MHz One 32-bit 3.2MB	100MHz/1.2G IDE, SCSI optional	IDE	3/0	Two 8-bit right-angle PCI slots, two PCI slots	25.5 x 7.5 x 24.5	\$8,075 (\$10M)			
Max Sys 486/25	Max Sys 486/25	25	DOS 3.3, 4.01, OS/2	Intel	Socket for Worldwide 4337, built- in cache 440BX	N/A	Internal-cache only	486/25MHz One 32-bit 3.2MB	100MHz/1.2G IDE, SCSI optional	IDE	3/0	Two 8-bit right-angle PCI slots, two PCI slots	25.5 x 7.5 x 24.5	\$9,375 (\$10M)			
Decatronics Corp. (403) 666-1670	Neurodrive 486	25	DOS 3.3, 4.01, OS/2	Intel	Worldwide 4337	N/A	Internal-cache only	486/25MHz One 32-bit 3.2MB	None	IDE	2/0	Two 1/2 height VGA ports	15.5 x 14.5 x 4.5	\$7,995			
Neurodrive 486	Neurodrive 486	25	DOS 3.3, 4.01, OS/2	Intel	Worldwide 4337	N/A	Internal-cache only	486/25MHz One 32-bit 3.2MB	None	IDE	2/0	Two 1/2 height VGA ports	15.5 x 14.5 x 4.5	\$7,995			
Neurodrive 486	Neurodrive 486	25	DOS 3.3, 4.01, OS/2	Intel	Worldwide 4337	N/A	Internal-cache only	486/25MHz One 32-bit 3.2MB	None	IDE	2/0	Two 1/2 height VGA ports	15.5 x 14.5 x 4.5	\$7,995			
Neurodrive 486/40	Neurodrive 486/40	25	DOS 3.3, 4.01, OS/2	Intel	Worldwide 4337	N/A	Internal-cache only	486/25MHz One 32-bit 3.2MB	None	IDE	2/0	Two 1/2 height VGA ports	15.5 x 14.5 x 4.5	\$7,995			
Dell Computer Corp. (512) 338-4400	Dell System 4125	25	DOS 3.3, 4.01, OS/2	Intel	Worldwide 4337, built- in cache 440BX	N/A	Internal-cache only	486/25MHz One 32-bit 3.2MB	100MHz/1.2G IDE, SCSI	IDE	2/1	One 16-bit PCI slot, one PCI slot	6.5 x 23.2 x 17.0	\$7,995 (\$10M)			
Digital Distributing, Inc. (401) 865-0007	486-Express Series V	25	DOS 4.01	Intel	Worldwide 4337	N/A	Proprietary	486/25MHz One 32-bit 3.2MB	100MHz/1.2G IDE, SCSI	IDE	2/0	Eight 16-bit PCI slots	16 x 10 x 17.0	\$4,995 (\$10M) \$5,495 (\$10M)			

HIGH-PERFORMANCE PCs

PRODUCT SPOTLIGHT

COMPANY	PRODUCT NAME	CLOCK SPEED (MHz)	OPERATING SYSTEMS SUPPORTED	BUS ARCHITECTURE	COMPRESSOR SUPPORT?	MEMORY CACHE	CACHE CONTROLLER	RAM STANDARD/HALF/HAMM	FLOPPY DRIVE	HARD DRIVE STANDARD/HAMM	CONTROLLER	STORAGE BAYS: HALF/HAMM	NUMBER OF SERIAL/PARALLEL PORTS	NUMBER AND TYPE OF EXPANSION SLOTS	DIMENSIONS (in.)	PRICE	
Digital Computer Systems (408) 638-1381	P.A.C. 400-25	25	DOS 4.01	ISA	Wintel MS-DOS 3.1/4.01 Windows 3.0/3.1/95	NEC	Integrated cache only	SDRAM/EDO	One 3.5-in. 1.44MB	One 3.5-in. 2GB	SPI	2/0	VGA	1/5	One 8-bit, one 16-bit	26 x 9.5 x 7.0 15.6 x 23.5	\$1,099
DTX Computer, Inc. (813) 333-7333	Fox 2500	25	DOS 4.01, 5.01 MS-DOS 3.0, 3.1, 3.11	ISA	Wintel MS-DOS 3.1/4.01	NEC	Integrated cache only	SDRAM/EDO	NONE	NONE	N/A	2/0	NONE	1/5	One 8-bit, one 16-bit, one 32-bit	19 x 7.2 x 6 13.6 x 20.5	\$1,261
Dyne Micro, Inc. (408) 943-4195	Dyne Workstation 4000 25	25	DOS 3.1, 4.01	ISA	Wintel MS-DOS 3.1/4.01	NEC	Wintel MS-DOS 3.1/4.01	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	SPI	4/0	Super VGA	1/3	Two 8-bit, one 16-bit, one 32-bit	35 x 8.8 x 6 18.75 x 21.5	\$1,699
Everex Systems, Inc. (415) 516-2246	Step 400Z	25	DOS 4.01, 5.01, MS-DOS 3.1, 3.11	ISA	Wintel MS-DOS 3.1/4.01	NEC	Proprietary	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	Everex 5200	5/0	NONE	1/5	Two 8-bit, one 16-bit	20 x 11 x 16 10.5 x 23.5	\$8,999
Step 400Z/25	25	DOS 4.01, 5.01, MS-DOS 3.1, 3.11	ISA	Wintel MS-DOS 3.1/4.01	NEC	Proprietary	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	Everex 5200	5/0	NONE	2/1	One 8-bit, one 16-bit, one 32-bit	24 x 11 x 16 12.5 x 23.5	\$1,999	
Step 400Z/33	33	DOS 4.01, 5.01, MS-DOS 3.1, 3.11	ISA	Wintel MS-DOS 3.1/4.01	NEC	Proprietary	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	Everex 5200	5/0	NONE	2/1	One 8-bit, one 16-bit, one 32-bit	24 x 11 x 16 12.5 x 23.5	\$10,499	
Grid 400Z/25	25	DOS 4.01, 5.01, MS-DOS 3.1, 3.11	ISA	Wintel MS-DOS 3.1/4.01	NEC	Integrated cache only	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	EDC, optional IDE, SCSI, SCSI RAID	3/0	Super VGA	1/3	One 16-bit SCSI	46 x 17 x 7 22.5 x 23.5	\$4,999	
Heath-Packard Co. (800) 732-0999	HP Vectra 405	25	DOS 4.01, 5.01, MS-DOS 3.1, 3.11	EISA	Wintel MS-DOS 3.1/4.01, Intel Pro/386, Pro/486	NEC	Integrated cache only	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	SPI	2/1	Optimal VGA, Super VGA, EISA, KCG	24 x 13 x 6.5 12.5 x 23.5	\$10,499		
IBM (800) 426-24888	Personal System/2 Model 70 series	25	DOS 3.1-5.0, MCA	MCA	Integrated processor, memory, disk, monitor, AIX, PCI, L3	NEC	Integrated cache only	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	SPI	3/1	One 16-bit, one 32-bit	5.5 x 14.2 x 2 21.5 x 19.5	\$11,399 (\$1044) \$11,999 (\$1045)		
Kontron Electronics (408) 257-1711, (800) 257-4833	IP-Lab 400 portable personal computer	25 or 33	DOS 4.01, Windows 3.1/95	EISA	Wintel MS-DOS 3.1/4.01	NEC	Integrated cache only	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	SPI	2/0	Super VGA	1/5	One 15.7 x 16.1 7.5 x 23.5	Price unannounced	
Laptops, Inc. (408) 266-2300	4200Mx	25	DOS 5.0, 5.1	AT	Wintel MS-DOS 3.1/4.01	NEC	Integrated cache only	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	SPI	2/1	CGA, Hercules	2/1	One 8-bit, one 16-bit	16.5 x 16.5 10.5 x 23.5	\$17,999
Micro System Solutions, Inc. (408) 730-8189	MES-400	25	DOS 4.01	ISA	Wintel MS-DOS 3.1/4.01, Windows 3.1/95	NEC	Proprietary	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	SPI	2/1	Eight 16-bit	8 x 13 x 6.5 7 x 19.5	\$21,999 (\$1450)		
MES-400/E	25	DOS 4.01	ISA	Wintel MS-DOS 3.1/4.01, Windows 3.1/95	NEC	Proprietary	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	SPI	2/1	Eight 30-bit	8 x 13 x 6.5 7 x 19.5	\$4,299 (\$1450)			
MES-400-GA	25	DOS 4.01, 4.01-5.0, 5.1	ISA	Wintel MS-DOS 3.1/4.01	NEC	Proprietary	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	Any available	6 or 12-bit IDE, 16-bit ATA, 32-bit ATA, 32-bit IDE	2/1	One 8-bit, one 16-bit	22.5 x 7 x 10 10.5 x 23.5	\$3,999		
Mitsubishi Corp. (714) 599-7333, (800) 643-4733	MIT-100	25	DOS 4.01, 5.01	AT	Wintel MS-DOS 3.1/4.01	NEC	Intel chip-set only	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	MTI 720, <td>2/1</td> <td>Two 8-bit, one 16-bit</td> <td>8 x 21 x 13.5</td> <td>NP</td>	2/1	Two 8-bit, one 16-bit	8 x 21 x 13.5	NP		
Mitsubishi Corp. (714) 599-7333, (800) 643-4733	MIT-200	25	DOS 4.01, 5.01	AT	Wintel MS-DOS 3.1/4.01	NEC	Intel chip-set only	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	MTI 720, <td>2/1</td> <td>Two 8-bit, one 16-bit</td> <td>8 x 21 x 13.5</td> <td>NP</td>	2/1	Two 8-bit, one 16-bit	8 x 21 x 13.5	NP		
Mohsin Computer Corp. (800) 643-4771	PW4/25	25	Interactive Windows 3.1/95 Version V	ISA	Wintel MS-DOS 3.1/4.01	NEC	Integrated cache only	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	SPI	2/1	One 8-bit, one 16-bit, one 32-bit internal modem	22 x 7 x 10 10.5 x 23.5	\$7,999 (\$1045)		
PW4/25C	25	Interactive Windows 3.1/95 Version V	ISA	Wintel MS-DOS 3.1/4.01	NEC	Integrated cache only	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	SPI	2/1	One 8-bit, one 16-bit, one 32-bit internal modem	22 x 7 x 10 10.5 x 23.5	\$8,999 (\$1045)			
National Marine Systems, Inc. (408) 445-0220	Flotek 400-25	25	DOS 4.01	ISA	Wintel MS-DOS 3.1/4.01	NEC	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	NONE	N/A	2/0	NONE	One 8-bit, one 16-bit, one 32-bit	18 x 21.5 x 12	\$4,699	
NEC Corp. (800) 426-2333, (510) 445-0220	PC400/MC 25	25	DOS 4.01, 5.01	MCA	Wintel MS-DOS 3.1/4.01	NEC	Integrated cache only	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	SPI	2/0	One 20-bit	8.5 x 20.5 x 14.5	\$4,699		
NEC Corp. (800) 426-2333, (510) 445-0220	PC400/MC 33	33	DOS 4.01, 5.01	MCA	Wintel MS-DOS 3.1/4.01	NEC	Integrated cache only	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	SPI	2/1	One 20-bit	8.5 x 20.5 x 14.5	\$14,399-\$15,000		
NEC Corp. (800) 426-2333, (510) 445-0220	PC400/MC 33	33	DOS 4.01, 5.01	MCA	Wintel MS-DOS 3.1/4.01	NEC	Integrated cache only	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	SPI	2/1	One 20-bit	8.5 x 20.5 x 14.5	\$14,399-\$15,000		
NEC Corp. (800) 426-2333, (510) 445-0220	PC400/MC	25	DOS 4.01, 5.01	MCA	Wintel MS-DOS 3.1/4.01	NEC	Proprietary	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	SPI	2/1	One 20-bit	8.5 x 20.5 x 14.5	\$14,399-\$15,000		
NEC Technologies, Inc. (510) 264-0000	Power Mate 400-25E	25	ISA, CGA, CGA/EGA, Monochrome, TGA	EISA, ISA	Optimal Hamm	NEC	Integrated cache only	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	NEC EISA, <td>2/1</td> <td>One 16-bit, one 32-bit</td> <td>17.5 x 21.5 x 12</td> <td>\$12,999 (\$1040)</td>	2/1	One 16-bit, one 32-bit	17.5 x 21.5 x 12	\$12,999 (\$1040)		
Business Mate 400-25E	25	ISA	ISA	Optimal Hamm	NEC	Integrated cache only	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	NEC EISA, <td>2/1</td> <td>One 16-bit, one 32-bit</td> <td>17.5 x 21.5 x 12</td> <td>\$12,999 (\$1040)</td>	2/1	One 16-bit, one 32-bit	17.5 x 21.5 x 12	\$12,999 (\$1040)			
Northgate Computer Systems, Inc. (800) 549-1999	Engage/400	25	DOS 4.01	ISA	Wintel MS-DOS 3.1/4.01	NEC	NEC MS-DOS 3.1/4.01, Windows 3.1/95	Proprietary	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	SPI	2/1	One 8-bit, one 16-bit, one 32-bit	16.5 x 21 x 16.5 10.5 x 23.5 height	\$1,099	
Novatek, Inc. (800) 643-4766, (510) 445-0220	Novatek Optima	25	DOS 3.1, 4.01, 4.01-5.0, 5.1	ISA	Wintel MS-DOS 3.1/4.01	NEC	Proprietary	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	Novatek N2400/2400	4/2	One VGA	2/1	One 8-bit, one 16-bit, one 32-bit	19.5 x 7.5 x 10 10.5 x 23.5	\$13,999 (\$1040)
Onc Technologies, Inc. (800) 344-2799	OTC 400-25E	25	DOS 2.1, 4.01, 5.0, 5.1	ISA	Wintel MS-DOS 3.1/4.01	NEC	Optimal Hamm	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	OTC N2400/2400	4/2	One VGA	2/1	One 8-bit, one 16-bit, one 32-bit	16.5 x 21 x 16.5 10.5 x 23.5	\$8,999
Onc Technologies, Inc. (800) 344-2799	OTC 400-25C	25	DOS 2.1, 4.01, 5.0, 5.1	ISA	Optimal Hamm	NEC	Optimal Hamm	SDRAM/EDO	One 3.5-in. 1.44MB	Optimal Hamm	OTC N2400/2400	4/2	One VGA	2/1	One 8-bit, one 16-bit, one 32-bit	16.5 x 21 x 16.5 10.5 x 23.5	\$8,999

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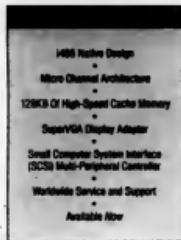
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HIGH-PERFORMANCE PCs

IN DEPTH

The delicate art of being credible

Honesty and a service focus win points with bosses, workers and users

BY WILLIAM HARRIS
and SUSAN BEHNKE

With the high turnover in information systems management these days, IS executives should be striving to protect their reputations.

It's time to learn the delicate art of staying credible.

Savvy IS managers already know this survival skill or are learning it. Unfortunately, many companies that have reorganized have diminished IS authority — or will do so soon. Reduced authority, of course, is the last thing that a chief information officer wants: It's tantamount to being fired. It's also proof that the IS manager has ignored the signs of waning credibility (see story page 100).

To some degree, knowing how to build and protect a reputation is intuitive. Some IS managers just seem to always know what to do and when to do it. But it's also true that IS managers can *learn* how to be credible. The secret is to ask (and honestly answer) some key questions:

Make no mistake: The process of building credibility is difficult. Being objective is hard, which is one reason for characterizing the art of staying credible as delicate. But credibility can make the difference between a brilliant IS career and mediocrity — or worse.

Before proceeding, you'll need to know a few things. First, you'll need a decent understanding of your corporation and its policies. You'll also need a good understanding of IS services — past and present — and relationships with outside vendors. And finally, you'll need to know about the personalities and politics involved in delivering and maintaining IS services.

In this process, it's especially important to view your users as customers. One good way to do this is by pretending that you are

Harris and Behnke are principals at Bebels Harris & Associates, Inc., a New York/Atlanta consultancy specializing in credibility building and integrating information technology with business strategies.

an outside consultant evaluating your organization. The discovery procedures and analyses used by consultants can be a great help in providing perspective on your situation.

Step 1: In-depth evaluation

After looking over the warning signs and applying them to your own situation, it's time for a second, more in-depth evaluation that focuses on a few key tasks:

- Defining the overall operational philosophy of the IS organization. Is it dictatorial? User participative? Leadership-oriented and innovative? Reactive? Does IS carry out changes for executive management?
- Determining organizational differences between IS and users. Are they centralized? Decentralized? One centralized and the other decentralized? Do these similarities or differences cause conflicts?

- Quantifying the allocation of IS resources among various user groups. Who gets more? Less? What is the quality of resources assigned to different groups?
- Determining expectations. How are users' expectations of IS performance established? How are these expectations communicated to the corporation?
- Seeing how IS interacts with users. What are the people-to-people contacts? What are the contexts for their interaction? What "sales" documents are used by IS? What reports are issued? What are the interpersonal capabilities of IS representatives in-

volved in user contacts?

- Understanding user dissatisfaction. How is unhappiness manifested? What impact does this dissatisfaction have on IS activities and productivity?

- Comparing IS with other service organizations. Do users believe that other staff or outside vendor firms are better at de-



Lester Soloff

livering their services than IS? If so, why? What do these groups do that IS doesn't?

- Obtaining IS opinions. Which IS staff member should be asked for perceptions on problems in the department?

Step 2: Data evaluation

The next step in correcting problems and building credibility is to closely examine the data on users' dissatisfaction and organize findings that can be converted into action. Some possible categories:

- Developmental projects. Such projects may exceed cost and time budgets, produce

• Credibility can be learned

• Asking the right questions is key

• Opportunities abound

systems that do not match requirements or impose more change than users can handle. Problems may develop when users keep changing their specifications and IS cannot hit the meeting target. Difficulties may also arise from inadequate user training on new systems.

• Computer processing and network services. Computer problems are too much downtime, late files when things go wrong, numerous recurring problems, unresponsive IS people (including the help desk), hard-to-use or inadequate end-user tools, late reports or negotiated performance contracts not fulfilled by IS.

• Work effort prioritization process. Mechanisms for prioritizing and defining development and maintenance efforts may be inadequate or lacking. Prioritization efforts may not be communicated well through user ranks, or mechanisms for prioritizing maintenance requests may be missing. Often lacking is a mechanism for appraisement of users whose requests are rejected.

• Inadequate backup. Computers or networks may have become inoperable because backups don't exist. The loss of skilled personnel may delay or impair development or maintenance activities, and IS management may have proven itself inadequate in handling a vendor during emergency recovery and cooperative efforts.

• Conflicting corporate policies. This is a tricky area. IS may be the sole provider of its services. In contrast, users can go outside for services offered by other company departments. IS may have full charge-back, while other departments do not. Or the chief executive officer may be using IS as a pawn man in attempts to change corporate organization or culture.

• IS organizational and people sensitivity. IS personnel may be seen as dictatorial and wanting too much control. They may be seen lacking a sales orientation and understanding of the business they are serving. They also may be seen as unenthusiastic about educating users.

• User/customer understanding of IS. Besides inadequate performance, IS

Mark W. Sullivan

Department Manager, Assistant Vice-President
First Interstate Bank of Washington
Seattle

You build credibility by staying current, reading various periodicals, participating in various seminars and keeping in touch with others in the industry. You need to live up to commitments and deliver products if you say you are going to. With employees, it's important to be honest and admit when you don't know something.

Thomas Cimino

Senior Vice-President of Information Services
Great American Life Insurance Co.
Los Angeles

First and foremost, you must not overcommit — do what you say you are going to do, and do it on time. You also need to demonstrate an understanding of business needs — speak a common language. It's also important to demonstrate your own expertise, to come up with the right answers before the questions are even asked.

You've got to show employees a willingness to work with them on the problem, to roll up your sleeves. You need to recognize and expect that there will be mistakes and not punish [people] when they occur. You always acknowledge when a job gets done and is done well.

Timothy A. Kenney

Manager of Information Services
Systemetrics/McGraw Hill
Santa Barbara, Calif.

faults may involve several other factors. Among them are a lack of appreciation of IS costs or benefits, insufficient commitment to the benefits by the users, a failure to comprehend the overhead or full life-cycle costs of IS and former IS staffers who as users second-guess the IS department. Another frequent failing is the lack of a post-implementation measurement of the value of a new IS setup.

• The IS organization itself. It may not be positioned properly within the company, may be improperly organized to serve its users or may not have the right people in the right positions.

How do you stay credible?

The best way to stay credible is by maintaining a high level of service and communication and letting people know that you appreciate their business. You've got to understand that there is a never-ending goal to meet other people's needs and know their needs.

With employees, constant communication is key. So is committing to things and sticking to these commitments. You also need to hire qualified staff members and help our employees with their needs; for example, providing training and better equipment.

Michael Simmons

Executive Vice-President of Technical Operations
Bank of Boston
Boston, Mass.

You need to be able to deliver products and services as indicated and the way people would like them. I never use force when not necessary. Have a clear understanding of problems; be open and honest and admit when a problem arises. You've also got to have confidence in your team's ability. You must be aware of everyone on your team and their abilities.

Michael Farrell

Vice-President of Systems
Automatic Business Centers
Morristown, N.J.

Deliver on time and tell them you will deliver on time — the message is more important than the fact. You need to meet your goals. Do your job and do it well — and let people know that you did it well.

STEFANIE McCANN

• IS infrastructure. Shortfalls here may involve such matters as appropriate controls, workable standards, policies and methodologies and adequate tools to ensure that IS can operate effectively.

Step 3: Action

Once the detailed evaluation is complete, it's time to develop credibility improvement recommendations and plans for implementing them. If these ideas seem unfamiliar, it could be a sign that new directions are in order.

Here's a good starting list of areas that provide opportunities for credibility improvement:

• **Organizational.** Including prioritization problems, development and maintenance shortfalls, funding or resource allocation problems among users and other matters.

• **Tactic:** Redefine IS functional responsibilities and authority to ensure that necessary activities are not overlooked and are performed by the appropriate personnel (for example, establishment of IS sales, marketing and product development functions).

• **Tactic:** Educate IS management and staff so they understand the business, company culture and politics as well as sales and marketing vis-a-vis selling IS to other departments.

• **Tactic:** Exploit training opportunities in several areas. Educate IS about trends in the use of information technology and train IS and general management on the necessity of integrating IS and business planning. Executive management should be trained in the understanding and involvement in IS. Users also should be trained to understand IS, especially the systems development and implementation processes.

• **Managerial.**
• **Tactic:** Establish a comprehensive management information and control program for the use of IS management.

• **Tactic:** Adopt the philosophy that IS

should be run like a business. Establish a formal marketing and sales function, with personnel skilled in sales acting as user representatives. Work with customer service and sales performance criteria for employee evaluation and rewards.

• Operational.

• **Tactic:** Install and use appropriate standards, methodologies, control, quantitative analysis activities, etc., to help im-

ONCE THE detailed evaluation is complete, it's time to develop credibility improvement recommendations and plans for implementing them.

prove development, maintenance and operational performance.

• **Tactic:** Install new hardware or software to improve IS operational capability.

• **Tactic:** Acquire staff with the right skills.

• **Tactic:** Provide additional training of existing IS personnel.

• **Tactic:** Use "customer appearance" methods where appropriate; that is, a fast-response maintenance/enhancement team that allows users to go outside or get their own equipment until IS can support them.

• **Tactic:** Adopt a marketing or public relations program involving the use of "annual reports," "quarterly reports" and special reports with respect to performance issues. The purpose of these is to recognize and reinforce positive performances.

All these suggestions flow from a basic but all-important reality: IS is a service business and should operate like one. Cultivating a service mentality is the single most important ingredient in staying credible. *

Warning signs for IS

I s your credibility warning? Look for some of the following warning signs:

• You have met business objectives (or feel that you've met them), but you have not received appropriate recognition.

• Others' users, chief executive officers, executive management, external customers of the firm, etc.) perceive that the information technology function is providing substandard service.

• Executive management is unhappy about the support the IS department is providing in terms of strategic use of information technology to bolster business and increase user and external customer productivity.

• You are receiving unsatisfactory support from an immediate superior, the executive steering committee or other key executives.

• The technology plan and corporate business plan are not well integrated.

• You are unable to sell executive management on appropriate budget levels, staffing and resources.

• You or your boss are dissatisfied with the marketing, customer service and business orientation of information technology staff.

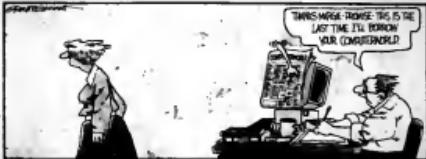
• Hardware and software changes disrupt user activities.

• The turnover in the IS department is acceptably high — and accelerating.

• Recent projects involving outside consultants resulted in impractical solutions, costly overruns, demoralized IS staff members and severe political problems for the chief information officer.

• Data center performance in terms of uptime, response time, change management, currency of hardware and software or other management criteria is inadequate.

WILLIAM HARRIS AND
SUSAN BEHNKE



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25. Manager, Systems
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26. Manager, Systems
27. Manager, Systems
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COMPUTER INDUSTRY

NATIONAL BRIEFS

In time for Flag Day

Cypress Semiconductor Corp. has planted the Stars and Stripes in the Soviet semiconductor market. Cypress Chief Executive Officer T. J. Rodgers is off to Zelenograd — the so-called Silicon Valley of the USSR — next month to discuss details of the technologies expected to emerge from the recently inked licensing pact under which his San Jose, Calif.-based firm will acquire certain manufacturing technologies and semiconductor manufacturing licenses from the Soviet Union's International Center for Informatics and Electronics.

Money in the door

Emboldened supercomputer firm FPS Computing (formerly Floating Point Systems, Inc.) signed a preliminary agreement last week, which was expected to result in a \$14.5 million investment by an institutional investor. President Howard Thraulio credited the scientific/technical user community's warm reception of FPS' Model 500EA Unix-based line with attracting the as-yet-unnamed investor. The money, he said, will be used to reduce debt and expand production and marketing.

More briefs on page 110

Chalk one up for Tally Systems

Software firm fills overlooked niche with PC Census, an inventory management tool

BY CLINTON WILDER
CW STAFF

Tally Systems Corp. has all the entrepreneurial earmarks of a software start-up from the go-go days of the early 1980s.

A huge list of "Things to Do" scrawled with a Magic Marker flows across three panels in a conference room, where bearded software engineers in chamois shirts exchange strategies with business-suited marketing types. Still, it's never so intense that the president can't spare a few moments for a scoop of Rainforest Crunch ice cream at the Ben & Jerry's store down the street.

From its peaceful A-frame headquarters in bucolic Hanover, N.H., Tally Systems hopes to grow by helping corporate information systems departments do their dirty work. Its software product, PC Census, automates the task of maintaining inventory of DOS-based personal computers throughout an organization — their model numbers, microprocessors, add-in boards and software. For PC and information center managers, that task is thankless, time-consuming — and often neglected altogether.

"Our competition," Tally Systems President Ted Jastrzemski said, "is a screwdriver and lots of interns in the summer."

The early 1990s are hardly the best of times for embryonic high-tech firms, but Tally Systems officials said they believe that PC Census has found an overlooked niche. "MIS has been doing a center management for years," director of marketing Tom Cerec said. "As PCs become legitimate contenders for processing, managing

Up and Coming: Tally Systems Corp.



"Our competition is a screwdriver and lots of interns in the summer."

- Location: Hanover, N.H.
- Incorporated: 1990 as Tally Systems; 1972 as DTSS
- President: Ted Jastrzemski
- Employees: 15
- Product line: PC-based software for automated inventory of PC hardware and software in organizations

those should be given the same attention."

PC Census sells at a price point that PC managers can sign for without higher-up budget clearance, according to Jastrzemski. The combined hardware and software tracking module sells for \$7.50 to \$12 per PC, depending on the size of the customer site, with a minimum of 50 PCs.

Tally Systems is brand-new in its present incarnation, but its roots go back 26 years to a joint research project between the computer vendor General Electric Co. and the computer department at nearby Dartmouth Col-

lege. That project developed the Dartmouth Time-Sharing System (DTSS) operating system for GE's computer line (later sold to Honeywell, Inc.). DTSS, Inc. was incorporated in 1972.

Metropolitan Life Insurance Co. acquired DTSS as a wholly owned subsidiary in 1978. DTSS developed close ties to Met Life's IS department, with Senior Vice-President IS Daniel Cavanaugh as its board and the IS producing as a test bed for DTSS products.

Jastrzemski, after a career at software firms Comshare, Inc., Thorn EMI Computer Services, Inc. and market research firm International Data Corp., joined DTSS in 1987. In the late 1980s, when DTSS sought to diversify the business, PC Census was born — albeit quite by accident.

DTSS was researching the market for an ambitious product that would distribute PC software from central hosts.

"We thought of the PC tracking module as just a small component of the whole system," Cerec said. "But Ted and I would get in the elevator after a customer visit, look at each other and say, 'Did you see them jumping out of their seats when we talked about that?'"

DTSS decided to shelf its other plans and concentrate on PC Census, which debuted in the market in 1989. Earlier this year, DTSS management purchased PC Census and other assets of the company from Met Life and set up operations as Tally Systems.

The newly independent Tally is small, with 60 customers in the U.S. and Canada and projected revenue of \$1 million to \$2 million this year. Jastrzemski said he believes the firm can

Continued on page 103

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COMPUTERWORLD

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Tally

FROM PAGE 101

double in size next year — an ambitious plan, but one he said is reachable because of the need that the product meets.

"The challenge is making people aware that this is out there and then being there when they realize they need a PC inventory," he said.

Tally Systems hopes to find a lot more customers like Glenn Katz, who heads PC support at Leviton Manufacturing Co., a privately held maker of electronic lighting devices in Little Neck, N.Y. Before installing PC Census five months ago to track 300 PCs in 14 locations, "we had no idea what was out there," Katz said. "When we inputted the inventory data, it was never consistent. It took me three months just to clean up the database."

Katz said the product also helps him support users. "The next time they call and say they can't get Lotus 3.0 to run, I tell them to check their inventory tag," he said. "Sure enough, their machine doesn't have enough memory."

EXECUTIVE CORNER

AMD names new officer

Richard Previte is the new president and chief operating officer of Sunnyvale, Calif.-based Advanced Micro Devices, Inc. The 55-year-old Previte, a longtime Advanced Micro veteran, has also been elected to the firm's board of directors. Together with Chief Technical Officer **Anthony Holbrook** and company Chairman and Chief Executive Officer **W.J. Sanders III**, Previte holds the recently created Advanced Micro office of the chief executive.

Cambridge, Mass.-based international management consulting firm Index Group, Inc., a business unit of Computer Sciences Corp., recently named Senior Vice-President **Adam D. Crescenzi** its new managing director of European operations. Crescenzi, who will be responsible for the full sweep of projects handled through the burgeoning 5-year-old London-based headquarters, succeeds **Ronald Mackintosh**, who is now chief executive of UK operations at CSC Consulting.

Waynesboro, Va.-based computer printer maker **GeminiCom** has a new president and CEO, 22-year IBM veteran **Paul T. Winn**. Winn, 43, most recently served as vice-president of graphics systems in IBM's Advanced Work Station Division.

In addition to PC managers in business and government, Tally Systems is courting business-oriented resellers such as Egghead Discount Software.

There, too, the biggest challenge is marketing. "We could rely on the [third-party] channel, but we have to create the opportunities ourselves to get the thing rolling," Jastrzemski said. PC Census "is something differ-

ent. It's not another word processor or spreadsheet," he added.

A PC Census diskette inserted into a PC automatically reads the configuration of that unit, printing out an inventory of disk drives, I/O ports, graphics adapters — whatever is installed. Tally Systems' recently introduced software inventory module does the same for soft-

ware, from the operating system to applications to Microsoft Corp. Windows 3.16.

"What I like about this product is it's very nosy," said E. Anne Gunn, director of field services. "It does a grungy, grunt work-type job, even though the technology behind it is mind-boggling."

Tally Systems is betting its New Hampshire farm on the

premise that PC managers, tired of glibly new solutions in search of a problem, will snap up grungy, grunt work software that meets a need.

"I haven't seen any software like this before," Katz said. "If it wasn't for this, I'd just resign myself to not knowing what's out there. If they market it right and exploit that, I think they can be really successful."

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INDUSTRY INSIGHT

Richard Pastore

Tearing down export walls



How would you feel if you labored for years to dismantle an immense, offensive wall, only to find another wall looming on the other side? You'd feel kind of deflated, wouldn't you?

Well, that's how a lot of Eastern European computer users are feeling. Their countries have succeeded in tearing down the walls of Communist restriction and repression, but now they face a red, white and blue barricade of stubborn export restrictions separating them from U.S. high technology.

According to analysts, the U.S. lags behind its allies in modernizing export policies.

The recent easing of restrictions on computer and telecommunications sales to the East by the Coordinating Committee on Multilateral Export Controls (Comex) is a giant step in the right direction — a direction in which we should continue to advance.

Otherwise, Eastern Europe may look to other technology beacons — namely, Japan — and the U.S. will forfeit a valuable market opportunity.

In April, large numbers of Eastern Europeans were allowed to leave their countries for the first time to look at Western products displayed at Comdex/Europe in Paris. Their desires and needs came through clearly.

"They are hungry for hardware now, and in a few years they will be hungry for software," said computer center project manager Nada Kose of her fellow Yugoslavs.

Though the Eastern Europeans spoke proudly of their countries' recent achievements, disappointment was evident when conversation turned to the U.S.

"Our import rules have been relaxed over the last several months; there are no restrictions anymore," said Dusmir Papandopulo, telecommunications manager at Elektro, Yugoslavia's largest electrical utility company.

The problem, he said, is that U.S. export regulations have not followed suit.

"We're more open, but we still have difficulty in legally importing U.S. equipment," said Prokop Toman, a Czechoslovakian economics professor.

"Legality" is the key word. It is possible to obtain U.S. big iron by sneaking it through a tangle of Far East and Western European distributors, but this channel is discouragingly difficult and expensive. Comex has vowed to make such "gray marketing" even more difficult.

The Romanians at the show talked of their hopes for U.S. trade with childlike eagerness. "Now we are open for business, for opportunities. This is a very unsaturated market," said Gheorghe Stefan Samoil, a senior engineer at the Institute for Computers (ITC), Romania's state-owned research center.

So far, however, their overtures have failed to breach the U.S. export barricade. "It is a problem to obtain imports from the U.S. We hope this will be relaxed in the future," said Calin Sandovici, a research and development engineer at ITC. Maybe this month's Comex agreement is the answer to Sandovici's hopes.

Meanwhile, Romania is buying from U.S. competitors in Western Europe, Taiwan and Japan. It is also forming close alliances with France's Groupe Bull and Alcatel.

Some Eastern Europeans are even willing to leave their continent to plead their cases on our own shores. There will be interested parties from Yugoslavia, East Germany and the Soviet Union lining up the vendor booths at the PC

Expo show this week in New York City, hoping to establish contacts with U.S. firms eager to export hardware and software.

Encouragingly, the U.S. Department of Commerce helped make these visits possible by allowing PC Expo promoters to publicize the show at U.S. embassies and consulates abroad.

With its Foreign Buyer Program, the Commerce Department is attempting to encourage contact between small and medium-size U.S. manufacturers and potential overseas customers.

Though the program is four years old, this is the first time the department has granted PC Expo the right to participate. The move is overdue.

Granted, until very recently, most

Eastern European currencies have not had the hard backing necessary to purchase U.S. products directly.

However, in both Czechoslovakia and Hungary, the situation has improved dramatically, according to Toman and Papandopulo. Changes are also expected shortly in East Germany and other Eastern Bloc countries.

Now is the time for the U.S. computer industry to push the funds to exploit these market opportunities and establish good relations with budding capitalist economies. It's high time to knock down our own outdated wall of restriction — and not just by removing one row of bricks.

Pastore is a Computerworld staff writer.

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D.C. area tops in system service

BY GARY H. ANTHES
CW STAFF

Propelled by a 61% increase in three years, the Washington, D.C./Baltimore area has moved to first place in the number of people employed by computer service firms, edging out such high-tech enclaves as Silicon Valley, Massachusetts' Rt. 128 and the New York City region.

A study by the Washington/Baltimore Regional Association (WBRA) of 10 metropolitan areas said that the area employs 69,867 people in firms providing computer programming, analysis, operations, maintenance and related services.

The New York region employs 69,606, while Los Angeles/Anaheim/Riverside comes in third at 45,266 and San Francisco/Oakland/San Jose places fourth at 43,636.

Nevertheless, Washington/Baltimore, with \$3.7 billion in sales, takes second place to New York in receipts for computer services. New York posted receipts of \$6.5 billion, while Silicon Valley grossed \$4.4 billion and the Los Angeles region took in \$3.7 billion.

WBRA, using figures from the U.S. Census Bureau and the U.S. Department of Commerce, found mixed results when comparing salaries across the 10 metro-

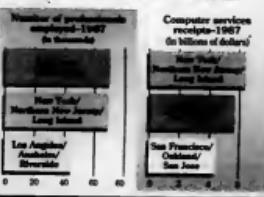
opolitan regions studied.

Systems analysts earned the most — \$344.50 per week — in the Houston/Galveston/Brazoria area and the least — \$723.50 — in Dallas/Ft. Worth. Programmers earned a top wage of \$708.50 in Silicon Valley and a low of \$580.50 in both Dallas/Ft. Worth and the Chicago area.

Operators' wages ranged from \$485.50 in Los Angeles/Anaheim/Riverside to \$392 in Philadelphia/Wilmington/Trenton.

Capital state

Baltimore/Washington may employ the most service professionals, but New York still rules in the most cash



Sources: U.S. Department of Commerce, Washington/Baltimore Regional Association



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INTERNATIONAL BRIEFS

Printer power

A decision late last month by West German technology companies Siemens AG and Mannesmann AG to combine their strengths in the worldwide printer market will mean a 50% expansion for Kent, Wash.-based printer manufacturer Mannesmann Tally Corp. The Mannesmann subsidiary — which is soon to be 49% owned by Siemens — will be starting its newly combined and broadened life with approximately \$450 million in worldwide revenue, as well as 2,400 employees and five major printer technologies.

Hitting a slump

Meanwhile, Paderborn, West Germany-based Nixdorf Computer AG, which is scheduled to merge with Siemens in early October to form what will reportedly be the largest computer company in Europe, reported 1989 annual revenue down 7% in the domestic market and up 4% worldwide compared with last year's figure. The year-to-year decline in revenue was a first for the entrepreneurial company — occasioned, a spokesman stated, by factors including a price slump in traditional Nixdorf markets and customer uncertainty in the face of the coming Siemens acquisition.

Most wanted

The New Zealand Department of Justice has a desire to be more vigilant when it comes to software copyright protection. First, however, the lawmakers would like to collar something that has proven to be elusive the world over: a definition of just what it is that is being protected. The hardest aspect of protecting software from copyright infringement, a department representative recently told the New Zealand Society for Computers and the Law, is developing an "inclusive and technically adequate" definition of a computer program.

REPORTER'S NOTEBOOK

Adapsos buttons down, tones upBY NELL MARGOLIS
CNET STAFF

WASHINGTON, D.C. — Adapsos recent annual members' conference and computing services industry association congressional meeting found the software industry association removed from the identity crisis that seemed to grip it a year or so ago — or at least better able to put on a calm front.

"This is the most businesslike Adapsos I've ever seen," one longtime attendee said.

In the halls of the hotel, some 1,200

software maven — approximately 33% from beyond U.S. borders, with the lion's share from Japan — gathered to hatch deals and negotiate alliances.

Meeting with what one seasoned industry observer unfriendly recalled as "the ego-driven self-aggrandizement and endless chitchat" of conferences past,

Absent as well was the strain that marked more recent Adapsos meetings: a concern with the wholesale defection of some of the industry's personal computer software firms from the decades-old association to the aggressively proactive and relatively young Software Publishers' As-

sociation (SPA).

"Frankly, if the issues that SPA is concentrating on — piracy, for instance — are a company's preoccupying issues, then SPA is probably where they should be," former IBMer and current Adapsos spokesman William Warner said. "Adapsos is trying to represent the software industry as a whole and on a whole-world basis."

It would be naive to believe that Adapsos recent turnout could be so neatly dispatched. One longtime member, for example, dropped out this year when faced with the prospect of a dues raise — itself an indirect result of the SPA challenge. Another member, a high-profile young software company, is hanging in with Adapsos for the moment, but one of its co-

founders acknowledged that it was casting sidelong glances at SPA. The industry, he observed, changes quickly, and Adapsos always seems a day late and a dollar short.

Nevertheless, according to Warner, the six months since the last Adapsos confab have seen positive gains, even in the area of its marketing goals: Such notable firms as U.S. Sprint Communications Co., The Gartner Group and long-sought-after but elusive Computer Associates International, Inc. joined McDonnell Douglas Computer Systems Co., a former Adapsos member, rejoined.

The newly buttoned-down and toned-up Adapsos meeting featured the following:

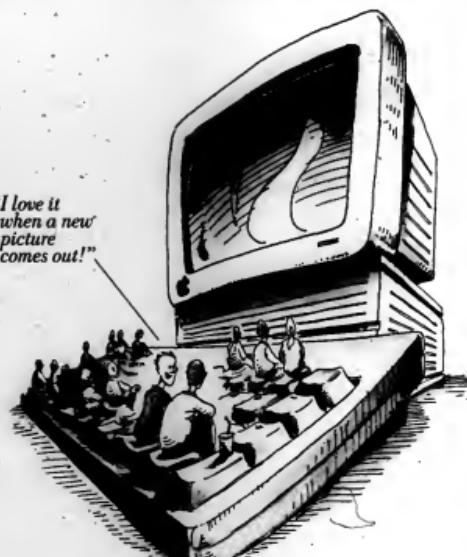
- A deal-making session in which each participant took the podium, introduced his company and described what kind of strategic partners it was in the market for. The "slave-market" forum, an experiment only three meetings ago, is now a staple of Adapsos conferences.

- A keynote speech by Japan Economic Foundation President Shiochi Akasawa. This was a homecoming of sorts, because Akasawa, who is also the former chairman of the Japan External Trade Organization, was the keynote speaker at Adapsos' premier world congress held in San Francisco 10 years ago. Akasawa urged his audience to shun protectionism and to continue to embrace trade negotiation. He also mentioned in passing that "80% of the parts in American computers are made in Japan."

- A workshop in which systems integrators sought to discover what users really want from them — fewer buzzwords, clear agendas and a quick trip from promise to performance.

- An address by Merrill Lynch & Co. Executive Vice-President DuWayne Peterson Jr. on what large customers expect from the software industry: standards and easy-to-use products — and also fewer buzzwords, clear agendas and a quick trip from promise to performance.

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Authorized Dealer

Bell Atlantic consolidates

FRAZER, Pa. — Bell Atlantic Customer Services, Inc. recently merged the muscle of its three computer hardware maintenance arms into a single service. The new entity, dubbed Bell Atlantic Computer Technology Services, Inc., moves into place as the largest U.S. fourth-party support services company, Bell Atlantic claimed.

Bell Atlantic said it consolidated the three units to eliminate redundancies and provide customers with a single point of contact. The units supply parts and repairs for large businesses that handle their own maintenance, OEMs and third-party maintainers such as the former Service, Inc.; now a separate Bell Atlantic subsidiary.

The three merged divisions are former Comex-CPX, which specializes in Control Data Corp. parts and repairs; Dyneservice Network, which repairs IBM and Digital Equipment Corp. head disk assemblies and peripherals; and Electronic Service Specialists Ltd., a DEC repair specialist.

John Welsh, executive director of sales and marketing, said the group will add new platforms to its service roster later this year.



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Federal IS vendors: There's good and bad news

BY GARY H. ANTHES
CM STAFF

WASHINGTON, D.C. — If you are selling products or services that support electronic data interchange, electronic imaging, computer operations and maintenance or anything to support a high-tech war on drugs, now may be the time to open that office in Washington. But if you are into leased telecommunications services or mainframes, you can expect slim pickings from the federal government during the next five years.

Those are among the conclusions to be drawn from an extensive analysis and

forecast of the federal information systems market recently released by the Electronic Industries Association (EIA).

The EIA said that Uncle Sam's spending on IS will show declining real growth during the next five years, moving slowly from \$19.4 billion in 1991 to a nearly flat \$20.3 billion in 1995. IS outlays by the U.S. Department of Defense (DOD) will actually decline, but spending will be strong at the National Aeronautics and Space Administration, the Environmental Protec-

tion Agency (EPA) and the Departments of Agriculture, Transportation and the Treasury, according to the EIA.

For defense, which will show an aver-

age 1.2% annual fall in IS expenditures, spending will be aimed at those systems promising to reduce manpower costs. A new DOD program, called Corporate Information Management, will drive much of what the Pentagon spends for its non-emergency and non-mission-critical systems, the EIA said.

In civilian agencies, IS spending increases will be driven by a growing trend to contract out to save on personnel costs, and agencies that traditionally do a lot of outsourcing — such as NASA and the EPA — will lead the way, the EIA said. Agencies that traditionally do a lot of outsourcing will spend 5.6% annual increases in IS spending, while civilian agencies will show only 3.1% gains.

Aggregate software purchases will be flat — no growth over the period — but sales of commercial off-the-shelf software and software tools will do better than average, the EIA said.

In commercial services, operations and maintenance will post a strong 3.7% annual gain, driven by budget squeezes that require retention and support of existing systems, and computer time-sharing outlays will rise 2.4% per year. Leased telecommunications services are expected to fall 1.3% annually.

Corporate Information Management is an attempt to reduce the number of redundant systems in the DOD and to define common data requirements and formats for applications such as payroll, distribution and contract payments. The EIA estimated Corporate Information Management will save the government \$2.2 billion over the next five years. There will be fewer small systems but more opportunities for system integrators to build large ones, the association said.

Industry Professionals Rate Document Imaging Companies

1990 AIIM Datapro Survey

	FileNet	IBM	Kodak	Wang
Overall Satisfaction	1	6	2	9
Software Features/Functions	1	12	6	2
Storage Media (Systems)	1	9	4	7
Expansion Capabilities w/o Conv.	1	4	8	5
Documentation	1	7	3	4
Image Quality/Resolution	1	11	2	6
Capture/Retrieval	2	11	3	4
Customization Capabilities	2	10	8	5
Input/Output Devices Supported	2	8	3	4
System Security/Recovery Features	2	3	6	4
Ease of Use	3	13	-	-
Service/S	-	-	-	-

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NATIONAL BRIEFS

Slimming with Shark

Wang Laboratories, Inc. earlier this month closed the sale of its Wang Financial Information Services Corp. to a newly formed Infotechnology, Inc. subsidiary called Shark Information Services Corp. The approximately \$16 million purchase price will go toward debt reduction and working capital, said a Wang spokesman, who also noted that the company will continue to supply financial market data to its customers.

Finally CFO

Control Data Corp. now boasts a new executive vice-president and chief financial officer, filling a slot that has been vacant for nearly a year. William J. Miller, 44, recently acting president of Micrognosis, CDC's trading room systems unit, assumed the title on June 11, reporting to CDC President and Chief Executive Officer Lawrence Perlman. Perlman has been acting CFO since the departure of John K. Buckner last August.

COMPUTER CAREERS

IS execs: In search of survival

Fertile organizations offer support, involvement and bench strength

BY JAY GAINES

SPECIAL TO CP

In recent months, there has been a tremendous amount of movement within the ranks of top information systems executives, particularly in financial services, in which technology plays an integral role.

In a few isolated cases, IS executives have been elevated to general management posts. Most of the time, however, executives appear to be playing a game of musical chairs in which an individual who has met expectations marginally or not at all in one job is tapped to solve a whole new set of problems.

Unfortunately, the track record of top systems executives entering an organization from the outside is poor. The odds are that such an individual will not be on hand three to four years down the road.

Breaking in

Among senior management positions, the job of top IS executive may be the most difficult to enter from outside a company. The difficulty arises from barriers of psychology, culture and language, as well as the expectations surrounding the role.

Invariably, the new IS executive suffers from culture shock

as he learns how to operate as part of the management team while taking charge of the initiatives that he was hired to pursue.

The IS executive's isolation can be compounded by a personal style and manner of speaking that are overly technical in orientation, a lack of comfort with technology on the part of management, the typically large level of investment in technology and the long time frame for completion of many projects.

The isolation also increases dramatically if the executive's agenda is viewed as one of technology initiatives rather than the needs and wants of the business unit or enterprise.

Blending in becomes even more difficult, and the chance of success lower, based on the extent to which the IS executive has a large and fragile ego, a big-bucks compensation package, a high profile and a high level of expectation.

In examining the factors that can baffle a new top IS executive, it is helpful to look at the handful of corporate cultures where technology has thrived and contributed meaningfully to the operations it supports.

The top IS executives in

these environments have been well-integrated into the management culture, and some of them have gone on to win significant general management responsibilities.

At numerous other organizations, there are pockets of successful IS activity. Here again, the role of organizational integration is key.

The following are true in both these groups of successful entities:

- The organizations tend to be flat, rather than hierarchical. There is strength throughout the ranks of information technology professionals. The role of the top IS executive is coordinating and supporting.

- Management encourages experimental innovation and managed risk-taking.

- The mind-set of the information technology professional is focused with the business. It is focused on making technology work and generally on keeping it simple.

- Successes tend to result from successive hits more than delivery of a megaproject intended to fix everything.

The critical factor for a corporate environment where the information technology discipline

thrives is attracting the most promising individuals into the IS organization, helping them develop and ensuring their integration with the business.

The job of building this environment is an undertaking to be shared by top management, the IS organization and the business units.

However, many of these business roles quickly become dead-end jobs; they don't compare to the opportunities in the IS arena available to a strong performer.

It is important to note, however, that IS professionals should demand that their organization provide the opportunity to be successful in IS.

S UCCESSES TEND to result from successive hits more than delivery of a megaproject intended to fix everything.

The key professionals in the IS organization must grasp the needs and dynamics of the business. At the same time, they must educate business professionals about the role and benefits of technology.

This type of behavior must be ingrained in the culture and apparent to professionals early in their careers if the organization is to forge a competitive edge through technology — and if IS executives are to make major career advancements.

HIDDEN TREASURES

It is also important for these organizations to keep managers in the IS organization. Individuals rising within the ranks of IS management often do not recognize what a valuable commodity they are or might become. They sometimes get distracted along the way, viewing jobs in business units as better opportunities than the ones in front of them.

They should take the initiative to identify the skills and experiences they need to reach their professional goals: exposure to competitive and strategic issues, for example, or the proper mix of applications development and technical operations. They should then demand that their organization provide opportunities for them to develop these skills and gain the experience.

Given an IS organization with this kind of depth, the successful IS leader still must ensure that he is integrated into the day-to-day thinking and operations of the business and has support from and access to top management. Top management can facilitate the integration of IS activity by perceiving the IS executive as an integral part of the team.

Gaines is president of Jay Gaines & Co., a New York-based executive search firm.

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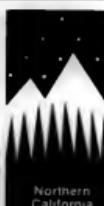
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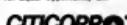
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We have recently completed a large strategic planning study and have a significant backlog of technical and application development projects. We are currently seeking the following:

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MARKETPLACE

Leading without bleeding

Equipment arbitrage can let you upgrade technology without red ink

BY THOMAS D. OLESON
SPECIAL TO CW

I've got to say this quietly. If everyone knows about it, and everyone tries it at the same time, it won't work. I'm talking about...uhh... equipment arbitrage.

What is it?

Arbitrage means buying in a weak market and selling in a strong market. In the case of computer equipment, this means buying at deep discounts early in a product's life, then selling before prices in the used equipment market drop with the introduction of replacement technology. The result is a high-end technology strategy that minimizes financial risk.

Let's review the basic rules of buying at a deep discount. You don't all work for Humanware Enterprises, Inc., so you may not be able to buy 1,000 personal computers at a crack for a 40% discount. But you probably don't have to buy just one at a time with no discount. If a year's worth of buying is 200 machines, and you purchase them together, you won't be able to convince them to sell the equipment in time to pull off the arbitrage.

Depreciation is the next consideration. To make a decent profit, vendors have to churn out new technology rapidly. Most of us were trained to depreciate equipment over five years, which allows the hardware giants to create book losses for us. They'll release new technology at a clip that pushes market values significantly below book values. Why

not reduce your depreciation period to four years for most equipment so you won't be hit with these book losses?

Whether purchased or leased, the timing of your move to the new technology is critical. Once new technology begins to replace current equipment, used devices on the secondary market will drive down the value of your assets. You must move quickly.

How quickly? It depends on the vendor's production schedule and marketing strategy, but three to four months may be too long to wait. To avoid delays, get agreements pre-approved based on market research. Research upcoming product announcements with staff members, technology think tanks and the vendor. Determine what the new product will do and when it is likely to arrive.

Here's a concrete example: A printer sold in late 1988 for \$4,400. Through a volume purchase, you might have gotten a 27% discount, yielding a cost of just over \$3,200. The used market price was still \$3,300 in November 1989 but fell to \$2,100 by May 1990. Had you pur-

chased the machines as late as the fall of 1988, you could have used them free for a year and replaced them with laser jet technology. But had you kept them for 18 months, they would have cost you \$1,100 each, ignoring depreciation.

Once you buy, what do you do with all of the old equipment? You might find a third-party remarketer who has a better opinion of it than you do, but therein lies the problem. Remarketers should have pretty much the same sense of its worth as you do.

Know thy lessor

The rule is, "Know thy lessor or broker." First, deal only with the ones you know personally, have worked with in the past and trust. Then assume you will give them a fair profit, even if it means setting for less than you'd like to get. And don't tell the world you have a lot of equipment to dump; if word gets around, it will drive your price down.

If you wish to collect top dollar from each sale yourself, offer the broker a flat remarketing fee for each machine sold, hold the unsold equipment and collect the proceeds from sales. Because you continue to own the equipment, you, not the broker, bear the full risk and thus deserve the lion's share of any profit. By doing this, you can minimize the remarketing fee. This approach poses no risk to the broker but

also offers little incentive to sell the machines, let alone to get the best price. You may end up with a bunch of unsold equipment after the market has softened.

A modification of this approach can bring you a higher total return and lessen the risk that equipment will go unsold. Agree up front to a partial payment from the broker for all the equipment and a percentage split of the rest of the proceeds that gives the broker more profit than usual. This kind of deal provides the broker with a greater incentive to get rid of the equipment before the market drops. If this goal is achieved, the result should be a win-win situation.

That's equipment arbitrage: For the right type of equipment, it's the ultimate in equipment technology strategies.

Oleson is financial director of information processing at John Hancock Financial Services in Boston.

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The BoCoEx index on used computers

Closing prices report for the week ending June 1, 1990

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XT Model 086	\$500	\$700	\$350
XT Model 089	\$650	\$825	\$475
AT Model 099	\$1,000	\$1,375	\$850
AT Model 239	\$1,100	\$1,325	\$700
AT Model 339	\$1,200	\$1,400	\$900
PS/2 Model 50	\$1,300	\$1,700	\$1,050
PS/2 Model 60	\$2,060	\$2,200	\$2,000
Compaq Portable II	\$1,475	\$1,725	\$1,400
Portable III	\$2,275	\$2,500	\$1,900
Portable 286	\$1,700	\$2,000	\$1,500
Plus	\$650	\$750	\$650
Diskpro	\$625	\$900	\$600
Diskpro 286	\$1,400	\$1,625	\$1,300
Diskpro 300/16	\$2,500	\$2,750	\$2,475
Apple Macintosh 512	\$500	\$775	\$450
512E	\$450	\$450	\$350
Plus	\$1,150	\$1,275	\$1,000
II	\$3,300	\$3,500	\$3,050

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TRAINING

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BY JESSICA KEYES
SPECIAL TO CW

Alexander Pope once said that "a little learning is a dangerous thing." Though he didn't have computer training in mind, his comment is certainly applicable to it.

The basic problem with computer training is that its message is short-lived. Information systems professionals and personal computer users are equally likely to retain little of what they are taught in expensive seminars. In fact, studies have indicated that the human mind retains less than 10% of what it hears.

Education is too expensive for us to throw 90% of it down the drain. Don't get me wrong: I'm not advocating an end to seminars and classes. However, several less expensive forms of "off-the-shelf training" can serve as adjuncts to live training and as substitutes for it in certain situations.

By off-the-shelf training, I mean the student can grab a video or a set of disks from a library

and learn by himself, at his own pace. He can start and restart a session as many times as he wants without slowing down anyone else.

This approach can help drive home the 90% of training that people don't retain the first time around, and it can stand in when live training isn't possible or practical. Do you have programmers scattered around the country in places where training facilities are not readily available? Just ship them a disk or videotape.

A lot of progress has been made on the videotape front since I was a grammar school kid and watched countless dry and boring tapes of men with white shirts, bow ties and crew cuts teaching assembler and similar tools. Videotape training has been spruced up; instructors speak better and camera movements are more sophisticated.

Today, it also covers esoteric subjects that can make a techie salivate: expert systems, neural networks, the C language and even the new C++ language.

What do you do if there is no videotape training for your topic of choice? One solution is to create your own. It's not as difficult as it sounds. With camcorders available for purchase or rent, your company might be wise to make use of them as an educational tool. One organization I know of that was training several hundred users in a new home-grown mainframe decision-support system held live training sessions, but managers found they needed to reinforce the material, so they videotaped their sessions.

Most camcorders tape from PCs or CRTs quite nicely, as long as the camcorder is set up on a tripod and focused carefully. A prepared script helps, too.

What is true for videotape training is also true for disk-based tutorials. By now, nearly every computer user has tried one of countless such programs,

which often come with packaged applications. They, too, are available for a wide range of subjects, including telecommunications, SQL, C and the Ada language.

Still, the list may not be exhaustive enough. You may need to develop a program for a home-grown system or a commercial product for which disk-based training is not available. As with videotapes, you can do it yourself; there are many tools available in the market to help you.

There are two types of software that you can use for this task. The first is called demonstration software. One of the nice things about it is its ability to capture screens. Let's say you just wrote a payroll processing system. If it is a host processor, you use emulation software to view screens on a PC. Using the screen-capture utility, you capture the pertinent screens by hitting a control key.

Then you retrieve the screens and enter text that will guide the novice payroll employee through the system's commands.

When the user boots up the "Payroll Trainer," he can walk through the steps necessary to log on to the payroll system and enter data on a new employee, modify records or even generate checks. There are a handful of

popular demo programs on the market; they cost about \$300.

You can develop a more advanced form of PC-based training using an authoring system. Authoring systems are complex packages that provide elegant features such as scripted tutorials, pull-down menus, prompt windows, animation, music, sound and even synthesized speech.

With this type of software, you can build interactive instruction in everything from an introduction to computers for naive end users to Cobol for programmer trainees and expert system methodologies for advanced systems professionals. On average, the authoring programs cost approximately \$500. They are geared for use by trainers, who will usually need a day or two to get started with one.

Pope was right. A little learning is a dangerous thing. We must train completely and effectively. To educate IS staff members and computer users that make up the people we charge must employ a variety of methods. Off-the-shelf programs might have made Pope sit up and take notice.

Keyes is president of New Art, Inc., a management and computer consulting firm in New York.

COMPUTERWORLD's

July Training Editorial Topics

2 Developing a training philosophy.

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The Pharmaceutical Industry

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9 Teaching IS about corporate culture.

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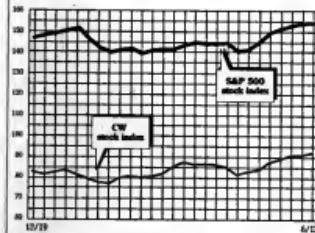
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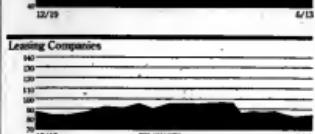
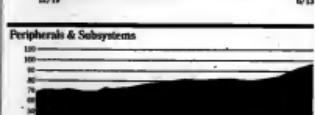
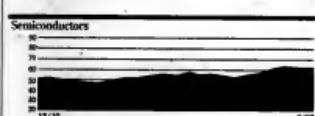
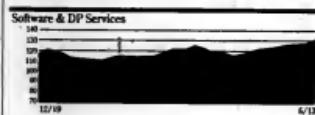
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N E W S

STOCK TRADING INDEX



<i>Index</i>	<i>Last Week</i>	<i>This Week</i>
Communications	124.1	125.4
Computer Systems	86.5	86.4
Software & DP Services	129.3	131.7
Semiconductors	62.3	63.0
Peripherals & Subsystems	95.2	98.6
Leasing Companies	82.6	84.0
Composite Index	90.8	92.1
S&P 500 Index	154.0	154.1



Computerworld Stock Trading Summary

Peripheral

Leasing Companies

Overboard

Tech investors jettison shares as profit dips loom on horizon

Pickle isn't the word for it. It may be wise to shed stock in a firm whose earnings have fallen, but what is it when investors jump to dump shares on mere speculation of lower-than-expected profits?

Nothing but trouble, according to Vitalsink Communications Corp. After saying that earnings for the current quarter may dip, Vitalsink watched its stock slip 2 1/4 points by Thursday to close at 9 1/2.

The big guys can also fall victim to the same shortsightedness. Digital Equipment Corp. fell 2% points to 86% on scuttlebutt that profits are not up to par. United Telemecan, Inc. declined 2% points to 40% as analysts lowered earnings expectations for the company.

Amidst the earnings-related ambush, other companies hit new highs. Compaq Computer Corp. ballooned to 127%, up 8½ points. Novell, Inc. also sat atop a new summit, up 5½ points to 55. But wait, there's more. Share prices of Storage Technology Corp. were up ¼ of a point last week to a new

high of 33%. Meanwhile, positive indicators in the semiconductor industry left Motorola, Inc. just shy of a new high, up 3 points to 86%, while Intel Corp. gained 14% points to end at 48. In other news, Lotus Development Corp. gained 2% points to finish at 384, after unveiling four Unix versions of its flagship spreadsheet. Oracle Systems Corp. and Borland International also picked up 2% points each, to finish at 22% and 204%, respectively.

EDWARD M. HARRIS

Wooing converts proves tough

BY AMIEL KORNBLAT
CW STAFF

While radical may be chic, the Next computer is no easy sell.

When Businessland, Inc., saleswoman Kathy Roepeke demonstrated the Next workstation at Stratus Computer, Inc.'s Marlboro, Mass., headquarters last September, she was pleasantly surprised by enthusiastic reactions from employees.

"People, including a lot of end users, were there from 10 in the morning to four in the afternoon," recalled Roepeke, who now manages the Stratus account for Businessland's Birmingham, Mass., office. "Everyone was very excited."

Roepeke, too. She said she figured that the sale, one of Next's first volume deals in the commercial market, would be wrapped up before the end of the year.

However, marketing Next, which incorporates unusual features such as an optical disc, stereo sound and an AppleScript display, turned out to be different from selling more established platforms. Although Stratus eventually did decide to buy the machine, nine months

elapsed before the deal was done. The minicomputer maker ultimately ordered 44 Next systems.

A look at the Stratus deal reveals some of the hurdles that Next and its distributors must cross to clinch more contracts:

- More than a personal computer. Next's use of the Mach operating system, a Unix derivative, and its strong emphasis on Ethernet connectivity make it more than just another commodity product. Selling Next turned out to be much more like selling a minicomputer or mainframe than hawking a PC, Roepeke said. In the case of Stratus, that means representations of compatibility and interoperability with the buyer's host systems had to

be satisfied.

- The unknown. Convincing a company to invest in new, untried technology is a challenge. "I never realized the amount of [organizational] levels that need to evaluate and sign off on a new platform," she said.

A new platform is viewed as "somewhat of a risk," Next Vice-President of Sales Todd Rulon-Miller said.

- Software, software, software. The availability of a quality application is key. Stratus had decided, after a two-year search, to adopt Frame Technologies' FrameManager software, one of the roughly 30 packages that can run on the Next. "Then, we looked for ways to run it on," said Carl Dennis, manager of

Stratus' technical publications department. After studying other workstation platforms, she made a recommendation to buy Next, she said, because "it felt extensible, easy to use, easy to learn, visually very clean and appealing."

- Entrenched standards. Sites free of installed PCs are better sales candidates for Next. At Stratus, the technical publishing staff previously worked on terminals running in batch mode off of a Strata-



Biznessland's Roepeke found the Next system a long sale

Revolution

FROM PAGE 1

"I'm not convinced Steve is still two years ahead," Bruce said.

For all of Jobs' braggadocio and tens of millions of investment dollars spent so far, the company continues to face formidable hurdles. A dearth of software applications and some disappointing technology have left potential buyers reluctant to commit to his new platform.

An exclusive distribution deal with computer retailer Businessland, Inc., that was expected to generate sales of \$100 million by year-end has recently fallen flat short, with Next insiders saying total unit sales, including direct sales to educational institutions, average only about 500 per month. These developments have observers wondering whether Next will live up to its early expectations.

Next's story provides would-be entrepreneurs with a textbook example of the difficulties of introducing a radical alternative to established technologies.

"With Next, you're looking at the future," said Doug Edwards, marketing director at Informix

Corp., which shipped a Next version of its popular Wings graphic spreadsheet in early May. "But sometimes the future is a difficult thing to understand, let alone embrace."

While no one is writing off the company, questions are being raised about why it has been slow to make its mark in the industry helped spawn. "It's a safe to say they're off plan," said Floyd Kvamme, a partner at Palo Alto, Calif., venture capitalist Kleiner Perkins Caufield & Byers. Kvamme was previously executive vice-president at Apple.

From a financial point of view, Next can afford to take its time, Jobs and his financial backers in Japan's Canon Ltd., billion-dollar H. Ross Perot, Carnegie Mellon University and Stanford University have invested \$133 million in the venture. IBM has also thrown its weight behind the venture with a potentially lucrative licensing deal that has been variously reported at between \$10 million and \$50 million.

That makes Next about five times the size of an average Silicon Valley start-up, Kvamme said. Canon's 1989 investment of \$100 million lifted the pro forma

valuation of the company to \$600 million, facilitating any borrowing Next may choose to do.

Observers noted, however, that even overfunding corporate coffers do not last forever if they are not replenished. Spending at Next has been high, although specific figures for the privately held company are not available. The high costs of research and development, advertising, a highly automated factory in Fremont, Calif., rental facilities of its Redwood City, Calif., headquarters and payroll for more than 350 employees mean Next is burning cash at a fast rate.

Planting roots

Is Jobs worried? Not yet. "What we're trying to do is grow a big old oak tree, and that takes time," he said in an interview. "If you look beneath any oak tree, you'll see a root system that's as big as the tree itself. And that's where we're in."

Although Jobs described annual sales as "healthy but not off the charts," International Data Corp. (IDC) in Framingham, Mass., estimated that fewer than 7,000 Next computers have been sold. Many of these have been spread among a range of product evaluators and software developers. In contrast,

its minicomputer. For some potential customers, a purchase can be delayed or scuttled if users accustomed to working on DOS-based PCs or Apple Computer, Inc. Macintoshes resist switching to Next's Mach.

- Higher price. Cost comparisons with similar platforms make Next a tough sell. Company President Steve Jobs has reportedly laid out a firm policy of no

price negotiating. Although their list prices may not differ much from that of Next, sharp discounting of PCs or Macs can make Next a less attractive buy.

"A Next machine is priced lower than a comparable Mac or PC fully loaded [with software]," Roepeke said. "But then, the Mac or PC has the heck discounted out of it and it comes out cheaper than the Next."

Barely passing

Ethnusism in the higher education market, once considered key for Next, is on the wane.

"Weeds on campus are blowing cool for Next use," said Tuffy Hammel, manager of library computer operations at the University of Washington in Seattle. "Nobody is satisfied," he said. High on the list of complaints, he explained, is the slow appearance of applications software.

Next's Vice-President of Sales Todd Rulon-Miller argued that the company is doing well in higher education, citing more than 300 contracts signed with universities for service and support.

The stakes are high. The desktop market for higher education may be worth as much as \$5 billion annually, according to Kenneth Green, senior research associate at the Center for Higher Research at the University of Southern California in Los Angeles.

Next has yet to make serious inroads into that market in terms of sales. Only about 100 of the 3,000 personal computers and workstations installed at Carnegie Mellon University, one of the company's founding investors, are from Next.

James Bruce, vice-provost for information systems at MIT, estimated that only 25 to 50 Next systems have been purchased through the school's microcomputer outlet. By contrast, students and faculty use about 12,000 IBM PC compatibles and Apple Computer, Inc. Macintoshes on and off campus.

"People are asking, 'Do I want to invest a bundle of money in a machine that may not make it?'" Bruce said.

IDC said Apple had shipped 445,000 Macs by January 1986, two years after its launch.

"They're clearly not where they want to be," said Dan Lavin of the Boston Computer Society's Next Users Group. "The question is, how far off are they?"

Next Vice-President of Sales Todd Rulon-Miller argued that it typically takes from 12 to 18 months of evaluation and testing before a new product hits its market stride. The Next machine only began that ramp-up cycle when the delayed operating system was introduced last October, Rulon-Miller said.

The slow pace of progress,

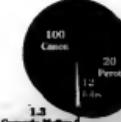
however, has Next's chances for success a little more each day, observers said. "Everyone agrees that if it had been able to come out a year earlier, it would have seemed more spectacular," said Richard Cyert, president of Carnegie Mellon.

Although the workstation was once a distinctly bold and elegant innovation, many of the same features and functions can now be had at a lower cost from other vendors.

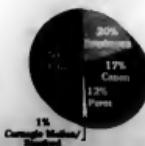
For example, icon-based windowing environments such as the Open Software Foundation's Motif, IBM's Presentation Manager and Microsoft Corp.'s Windows are making Next less

It's good to be the king
Jobs' investment of \$12 million bought him 50% of Next, while Canon's \$100 million only landed it 17% of the company in 1988

Capital investment (in millions of dollars)



Ownership



Source: Next, Inc.

JUNE 18, 1990

Nextstep seduces developers

BY JAMES DALY
CW STAFF

Steve Jobs positively glows when discussing Nextstep, the applications development environment that is turning heads among software authors. "Nextstep is ultimately our largest gem," the founder of Next said recently.

Although opinions of Next's hardware platform vary widely, the Nextstep package seems to garner widespread praise not only for its simplicity and strength but also for the doors it opens for developers.

The reason? While the Unix operating system offers sophisticated features such as powerful networking capabilities and multitasking, it also employs a laborious and archaic command system that is difficult to master.

Nextstep hides the complexity of working with and developing for Unix behind an icon-based system of pull-down menus and windows. The most widely regarded feature of Nextstep is the Interface Builder, which makes it easier to write programs by using prepackaged computer code known as "objects."

"Users need an interface that mere mortals can understand to get Unix on the desktop," Jobs said.

The Unix market is an impor-

tant target for many to hit. Market research firm Dataquest, Inc. has predicted that by 1992, 26% of all desktop machines will be running some version of Unix.

Some analysts have also speculated that the popularity of Nextstep would one day propel Next into becoming a software-only company. Jobs, however, has clapped such theorizing. "Not likely," he said.

Software authors speak enthusiastically of the ease of developing programs with Nextstep. "It's a lot easier to prototype," said Alan Olsen, product development manager for Lotus Development Corp.'s next spreadsheet project, which began in early 1989.

Forreverbout

It may also be one of the great ironies of the computer industry that IBM, which Jobs once painted as the antithesis of everything he stood for back in his Apple days, has signed off to use Nextstep for its RISC System/6000 workstation.

Despite the significant vote of confidence, however, IBM's interest adds confusion to an already confused marketplace. Nextstep is not only out of step with IBM's proclaimed strategic emphasis on OS/2 but rests uneasily with its commitment to the Open Software Foundation's Motif interface.

quest, Inc. researcher at the firm's Stamford, Conn., conference last month.

Last fall, acknowledging user complaints, Next was forced to offer a traditional magnetic hard disk as an option. Most of the units currently shipped reportedly include it.

Some analysts viewed IBM's endorsement of Nextstep as a hedge against its commitment to OSF/Motif and an admission that perhaps Nextstep's programming environment is superior.

OSF/Motif sometimes seems like a product designed by committee, a committee over which IBM sometimes feels it has little control.

Although the Next interface and IBM's marketing department make a powerful combination, a key question is its ability to deliver meaningful applica-

tions in a timely manner.

Speaking in his typically confident manner, however, Jobs claimed that 150 software developers have made a major financial commitment to developing Nextstep applications and rated the priority of developing Next packages only behind DOS, OS/2 and the Macintosh.

On-deck hitters

With hardware sales slow, Next hopes to lure customers to its platform with an array of upcoming enhancements:

• A model based on Motorola's microprocessor will be available by the end of the year. The current version uses the older 68030 chip. Today's users will be able to purchase an upgrade board for \$1,495.

The only notable hitch is that a federal judge, Tom Coughlin, ruled that the architecture of the 68030 infringes on certain Hitachi Ltd. patents, and Motorola may be forced to stop selling the chip because the 68040 uses several of the same design features as the 68030.

• A system offering a color monitor has been promised for delivery before the

snow flies. The new offering will provide photo-realistic color and a graphics accelerator.

• Because some users have complained that the Next machine still runs too slowly to manipulate sophisticated applications quickly, speculation has begun to circulate that the firm will introduce a model based on the reduced instruction set computing (RISC) architecture.

Analysts said a likely supplier could be IBM, which has hinted that it may license out the high-performance core of its RISC System/6000 line to the International Organization With Enhanced RISC (POWER) chip. The 64-bit architecture provides I/O throughput of as much as 40M byte/sec. and is capable of processing up to five instructions per machine cycle.

JAMES DALY

Start-up stories

With less than 7,000 machines shipped in its first two years of business, Next is not setting any records

	Shipping	Units
Sys	Jan. 1988	7,795
Compu	Jan. 1989	111,000
Apple Macintosh	Jan. 1984	445,000
Next	Oct. 1988	~6,775

*As of June 1990

Source: International Data Corp. CW Chart: Dennis Duke

distinguishable from the rest of the pack. In addition, the workstations of most vendors today are offered with some flavor of Unix as an option.

The machine's innovative features include stereo sound, optical disc storage, a built-in Ethernet port and an Adobe Systems, Inc. Postscript-based video monitor offering what-you-see-is-what-you-get display. Its advanced Mach operating system is a Unix version developed at Carnegie Mellon.

Yet information systems executives who have evaluated the machine have been lukewarm, forcing Next to backpedal on some of the features it once called its most revolutionary. The 256MB-optical disc, for instance, was once envisioned as Next's strongest lure, able to provide up to 200 times the capacity of a floppy disk and more than 10 times the storage of most hard disks. With the disc, it was envisioned that developers could beef up their standard offerings with such capabilities as dictionaries and comprehensive Help files.

However, users have complained that the device's performance is too slow, and Canon's shipments of the much-ballyhooed discs have "slowed significantly," according to a Data-

Beiling, said Next would have to offer a color monitor before he would consider investing in the machine. "None of the art directors here would be able to work in a black-and-white world," he said. The agency currently has 650 Macs installed.

Next officials have promised a color monitor version by the end of the year, the end of the year.

A lack of wide-ranging software has also hampered sales and undermined Jobs' business plan. "When they get some better software, I'll give it a try," said Ed Klein, director of the information center at Hauseman, Inc. in Louisville, Ky.

Calling the machine "technology in search of an application," Davis said he does not see a "burning" application that couldn't be done some way on the Mac." The advertising agency has 140 Macs divided between its New York and California offices, as well as 850 IBM Personal Computers.

"We need to supply credibly great applications, and then the whole situation will take care of

itself," Jobs said.

This is expected to happen during the next few months, as more and more business software developers host consultant parties for Next-oriented applications.

"Businessland spokesman said, "We're looking at lots of spreadsheet packages as well as word processing and front-end database applications," said Kevin Compton, director of advanced systems at the San Jose, Calif.-based firm.

A 40-member team at Lotus Development Corp. has been working full-time for more than a year developing a new spreadsheet for the Next machine. Although the Cambridge, Mass., company refused to say when its so-called Back Bay product will be available, Jobs indicated it would be out by the fall. He added that there will be at least one other spreadsheet coming out this year, in addition to the Wingz and Lotus packages.

The promotional capital earned from being part of Jobs' latest venture is reason enough for some software companies to come to the machine. "It's a high-quality platform," Edwards noted.

Some developers have found it easy to port their software to the Next computer. Stephan Adams, president of Oakland, Cali-



Jobs: Next is trying to grow a big old oak tree, and that takes time.

Many potential users also grumble about the absence of a floppy disk drive for copying programs and data. "It's strange to think about working without a floppy," said Perry Davis, senior vice-president of technology management at Seastech & Sastchi Compton, Inc. in New York.

The machine's lack of a color monitor has also been cited. Jeff Katz, IS manager of the creative department at California advertising agency Foote, Cone and

if-based Admatron, developer of an office automation system for managing and tracking client communications, said, "Our experience was fantastic."

Not all developers have found the port so simple, however.

"There is more flexibility in developing for [OSF]-Motif," Edwards said. Next is "being very religious about their interfaces . . . it's an obstacle if you want to bring Mac applications over and make them work in the same way," he said.

A half-dozen engineers at Informix worked for more than a year to port Wings to the Next platform.

"The port wasn't automatic," said Malcolm Hobbs, director of product marketing at 5-year-old Frame Technologies Corp. in San Jose, Calif. He said it took two engineers six months to port the company's Unix-based tool publishing software to Next.

Neither Jobs' reputation nor his backers' deep pockets can carry the company indefinitely, observers warned. As developers continue their struggle to offer software applications, the novelty of Next seems to be wearing off. In the fickle and fast-moving world of computer start-ups, Steve Jobs' latest venture has yet to earn a place in history.

NEWS SHORTS

Honeywell nabs Chrysler executive

Chrysler Corp.'s executive director of MIS, G. Nichols "Nick" Simonds, left the auto giant earlier this month to become Honeywell, Inc.'s new vice-president of corporate information management. Simonds replaced Irwin M. Wyman, who retired in April. Simonds joined Chrysler as information systems chief in 1984 after 20 years in IS with Inland Steel Co. and the former Steel Co. Chrysler named Harry A. Lewis, operations group controller and a 25-year company veteran, to replace Simonds.

Sun edges IBM

Sun Microsystems, Inc. produces the favorite workstation computer for Fortune 500 IS executives, according to a survey by The Sierra Group/First Boston MIS Executive Council. IBM's RISC System/6000 appears to have scored early points with users and came in second in the survey. Hewlett-Packard Co.'s Apollo division and Digital Equipment Corp. came in third and fourth, respectively. The survey ranked 13 issues that large companies consider when purchasing workstations, including compatibility, power, graphics capabilities and price.

Software groups unite

The Business Software Alliance, a group of six software companies taking legal action against software pirates in Europe and the Pacific Rim, has decided to merge with the larger Software Publishers Association (SPA), the Washington, D.C.-based group announced last week. The Business Software Alliance will retain its name and become an arm of SPA responsible for international copyright and trade issues.

Memorex plans optical archive

An optical storage-based archiving system is under development at Memorex Telex Corp. Slated for delivery in the fourth quarter, the company's first optical system will include on-line report management and microfiche replacement functions and will involve transparent mainframe-attached optical disc drives and robotic media handling designed to place as much as 340 billion characters of storage in 15.8 sq ft. The system is currently being tested at several locations internationally.

Datapoint adopts Oracle

Datapoint Corp. last week announced that Oracle Systems Corp.'s Oracle 6 relational database software is now available to run on the hardware vendor's 7000 series of Intel Corp. 80386- and 1446-based single and multiprocessor network servers. Using Oracle's SQL/Net/Net8 protocol, Datapoint 7000 series servers can function as the database engine for any user on the network whose application employs this interface. According to Datapoint, a 7850 model server can support as many as 64 concurrent Oracle users on a network.

AT&T offers LAN products

AT&T announced a slew of local-area network interconnectivity products last week, including its first Fiber Distributone Data Interface (FDDI) offerings. An FDDI backbone interconnects 802.3 Ethernet LANs and an FDDI router is said to interconnect up to two FDDI Dual Access Station networks and up to 28 Ethernet LANs over a wide-area network. An FDDI concentrator is said to link any FDDI device, including bridges, routers and workstations, to an FDDI ring. AT&T also upgraded its DataKit II Virtual Circuit Switch.

Clip-art controversy rolls

Computer Support Corp., a graphics software developer affiliated with Control Data Corp., sued Software Publishing Corp., alleging that hundreds of clip-art images contained in Computer Support products were copied without permission in three of Software Publishing's popular Harvard Graphics programs. The action is a counterclaim against a Software Publishing suit that claims Computer Support's software and clip art are not protected by U.S. copyright laws.

GAO: Uncle Sam hasn't been minding the books

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — Accounting system flaws and management lapses have contributed to hundreds of millions of dollars' worth of discrepancies in the books that account for public debt and related interest, the U.S. General Accounting Office (GAO) found.

According to congressional auditors, the U.S. Treasury Department is unable to verify that reported interest payments equal actual payments. As of December 1988, 18 account balances totaling more than \$53 billion had not been reconciled or verified since the early 1980s, the GAO said.

The GAO said it had neither sought nor found evidence of fraud or abuse but had found an account, out of balance by \$163 million, that appeared vulnerable to fraud. However, the report did identify almost \$1 billion in errors.

Officials at the Treasury's Bureau of the Public Debt generally agreed with the auditors' conclusions but said substantial progress had been made in recent months in reconciling accounts. Richard Gregg, commissioner of the Public Debt, said the bureau's own extensive efforts to clean up discrepancies had turned up no evidence of payment errors or incorrect issues

of securities. No improprieties were found, he said.

Gregg said the bureau had reconciled 16 of 18 accounts. However, the two remaining accounts total about \$37 billion. He said the remaining imbalances involve transactions going back a number of years, while current accounts have balanced for the past two years.

One of the accounts not yet



reconciled tracks over-the-counter deposits and disbursements in the Securities Transactions Branch. The GAO cited earlier reviews by the Treasury Department that found that "the branch's internal controls were so lax that unauthorized employees had access to blank Treasury checks and the checkwriter."

Citing the weaknesses in "securities, widespread and long-standing," the GAO cited the Treasury's failure to perform timely account reconciliations, lack of controls for detecting and correcting errors, lack of systems integration, poor accounting

system documentation and lack of training for accountants.

Gregg said account imbalances often occur because of timing differences caused by the bureau's patchwork of antiquated manual and automated subsystems. The situation will be much improved when the bureau installs a new integrated accounting and reporting system next year, he said. Gregg also said that the underlying systems that actually control payments and securities have better controls than the accounting system.

The new Public Debt Accounting and Reporting System, begun in 1986, is being developed by the Federal Reserve Bank of Cleveland. It will be installed on an IBM 3081 mainframe and will have electronic links to each of the 36 Federal Reserve banks and branches. The banks and branches, which handle much of the day-to-day activity in Treasury securities, will send transaction records to the Bureau of the Public Debt in daily batches or on-line, said Van Zeek, deputy commissioner of the Public Debt.

The new system will offer two key advantages over the existing collection of loosely coupled subsystems, Zeek said. All data will be sent in electronic form, eliminating the erroneous data keypunch from parallel transactions. The system will also employ double-entry accounting, eliminating the need to reconcile the single-entry subsystems.

The GAO said the new system will help, but management will also have to strengthen its oversight of operations.

Unisys backs Presentation Manager

BY ELLIS BOOKER
CW STAFF

BLUE BELL, Pa. — Seeking to enlarge its presence in the network computing market, Unisys Corp. today plans to publish a common user interface for CTOS, its multuser computer system.

Company officials said last week that Unisys has licensed and will support Microsoft Corp.'s Presentation Manager — becoming the first non-OS/2 operating system to do so — as well as Microsoft computers. On the Unix front, Unisys said CTOS/Open will be the first non-Unix operating system to support the government's Posix specification. These tools will be the core of the next generation of CTOS' software development environment, Unisys said.

At a conference for CTOS users and international developers being held in Paris today, Unisys plans to publish application programming interfaces based on Presentation Manager for both graphical and character-based

CTOS workstations

The move will complete the effort, begun at last year's Paris conference, to standardize the CTOS systems sold by Unisys, France's Group Bull and eight other vendors [CW, June 19, 1989]. According to Unisys, there are 740,000 of the modular CTOS systems, which are based on Intel Corp. 80286 and 80386 microprocessors, installed worldwide.

Unisys' commitment to a graphical user interface was praised by CTOS user Dan Lienau, director of data processing at the Wisconsin Department of Employment Relations in Madison. "I'm glad they're moving that way," said Lienau, adding that applications for his network of 55 diskless CTOS workstations "lack some of the features and user friendliness available for PC LANs."

Lienau is a dual operating and multi-networking system that Unisys has owned since 1988, when it acquired Convergent Technologies, Inc., a CTOS developer and OEM.

While arguing that CTOS/Open is both less expensive and more powerful than the two dominant alternatives for multiuser computing — minicomputer-based architectures and personal computer local-area networks — Unisys officials and analysts acknowledged that CTOS has been somewhat of a sleeper in the marketplace.

"Nobody plays up Unisys asking for a CTOS solution," said Drew Hoffman, vice-president and general manager of Unisys' Network Computing Group-Distributed Systems Division.

However, John Logan, vice-president of the Aberdeen Group, a market research and consulting firm in Boston, said he believes that CTOS, with its message-based operating system, offers a distributed computing model that the IBM still promises with its Office-View.

Logan said the configuration requirements for CTOS are greater at least for IBM's Systems Application Architecture and OS/2 Extended Edition combination.

Olsen

FROM PAGE 1

sluggish U.S. market and slowing European computer sales meant "external forecasts of this quarter's earnings would appear to be too optimistic."

"I think Wall Street, in the last week or so, is catching on that this is going to be a bad quarter," said Robert Herwick, an analyst at Hambrecht & Quist, Inc. in San Francisco.

force his company into massive layoffs or slow the pace of research and development. He said there is no corporatewide goal for employee cutbacks, even though DEC has managed to convince only about 2,000 employees out of more than 125,000 to take advantage of generous severance plan offers.

Olsen argued that chopping down the payroll can damage a company's customer service once it begins to grow again. "We make no claims this quarter

and a line of applications servers, according to several analysts. The VAX 4000 is the successor to the Microvax 3800 and 3900. Equipped with a more advanced chip from the 6000 line, it will deliver twice the performance, expandability, memory and storage capacity.

In his discussion of the changes underway at DEC, Olsen acknowledged that Jack Smith, senior vice-president of operations, is assuming more of the day-to-day responsibilities of running the company. "I dump everything I can think of dumping on him," Olsen said.

"I think we're carefully making believe there's not a spot-light on him," the DEC founder and president explained. "It's unhealthy, you see, to be crown prince when the king isn't about to give up."

Olsen also hinted at coming changes in the company's approach to the retail computer market, which DEC has assiduously avoided since its disastrous attempt with the Rainbow and Prefect desktop personal computers in early 1980. The company is now working on its own fast Corp. 80386- and 486-based desktop machines and will likely rely on those retail channels to target small business customers.

For its customers in the U.S. world, Olsen said DEC would eventually "phase together" its own Ultron operating system with the OSF's OSF/1 operating system. Analysts interpreted that to mean that DEC would essentially replace the underpinnings of its own Unix version

is going to show all the positive things that people are looking for," he said, "but our investments are to grow, not to catch back."

The next round of new hardware products is expected during the second week in July at Deworld in Boston, with the announcement of the VAX 4000

A key component of Cohesion, according to Dancy, is CDD/Repository, DEC's distributed repository based on an object-oriented interface.

The latest version of CDD/Repository, introduced last week and slated for availability by the first half of 1991, was designed to run on both DEC VMS and Ultron platforms, Dancy said.

CDD/Repository reportedly allows the user to run both technical and commercial applications and organize them in an object-oriented manner.

The new version allows a user

to change part of a program without disrupting the whole, said Alfonso DiSilva, DEC's engineering CASE program manager.

DEC also unveiled CDD/Administrator, VAX Rally Version 2.2 and Vxnet Version 10.

CDD/Administrator is a DecWindows/Motif-based tool that gives users access to CDD/Repository, Dancy said.

Vxnet Version 10 includes five new CASE components, which provide capturing, viewing and reporting capabilities for VAX 6000/9000 for vector processors.

DEC's Kenneth H. Olsen says firm's future is bright

The VAX 9000 shipping delay is being caused by manufacturing glitches, delays with parts suppliers and the complexity of the operating system, Olsen said. He declined to predict any show of profit from mainframe sales in 1991.

Olsen did say that "end-of-the-season doldrums" would not

change part of a program without disrupting the whole, said Alfonso DiSilva, DEC's engineering CASE program manager.

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COMPUTERWORLD

Take it from the top

Ken Olsen, DEC's only president in its 33-year history, is known to be colorful and candid. In an interview with *Computerworld* last week, Olsen spiced his comments with views of DEC and the industry.

On the confusion caused by DEC's stream of product announcements: "There are a lot of products coming out, and that does cause confusion. But we have a choice of getting behind or making too many products."

On whether problems within the sales force drove away former Senior Vice-President Jack Shields after 28 years at DEC: "I don't know. I never asked him. It just didn't seem polite. He didn't say that was why. He didn't say at all."

On efforts to reduce the employee head count: "I'm not saying that's not going on. I'm not conscious of it because it's not at the level where it's my kind of problem."

On whether DEC has plans to resell Apple Computer, Inc. Macintoshes: "I asked that question and so far haven't gotten any good answers back. If anything, I say we should have done it years ago."

On the continuing difficulties for DEC stock: "Wall Street is interested in profit today, and we're not making the profit today we should."

On paying a dividend to shareholders: "We've been making cash for quite a while now. It's probably the right assumption that we should pay dividends. The problem is, our advisers say 'Not now.'"

GLENN RIFKIN

with the OSF standard.

"Ultron will still be DEC's implementation of Unix, but OSF/1 will be the base standard operating environment," said Dale Kutsick, an analyst at Meta Group, Inc. in Westport, Conn. "What most vendors will do is add their own value on top of this basic Unix system that has been standardized."

While Olsen said he no longer believes in committing to "a VMS-like Ultron," he confirmed that the company is forming a strategic alliance to develop a standard OSF/1 port on VMS. The spectrum of scientific and technical DEC users who demand Unix is "a large part of our market and very important to us," Olsen said.

Features Editor Glenn Rifkin contributed to this report.

Ingres/DEC deal tabled

BY JEAN S. BOYD
CW STAFF

ALAMEDA, Calif. — It would have meant millions of dollars in cash for Ingres Corp., but Digital Equipment Corp. last week refused to take a proposed minority position in the relational database company.

Ingres said it announced the break in negotiations because the Securities and Exchange Commission considered it a "material" event that could have affected Ingres stock prices.

Negotiations between the two firms broke off after a month of meetings, Ingres Vice-President of Marketing Chip Greendale said. "We were looking to establish a closer relationship with DEC and to gain an additional source of cash," Greendale explained. "But the talks broke off around the issue of supporting open systems. We really have a problem with any relationship that wouldn't allow us to do that."

DEC would not comment on the details of the negotiations, which were initiated by Ingres. "We mutually agreed not to build

a technical partnership with them," said DEC spokesman Jeffery Gibson. "We will continue our other activities with them, which include licensing agreements."

Ingres' SQL relational database management system that is packaged with some DEC Unix workstations, and the Ingres DBMS is sold as an option for DEC VAX computers.

DEC may have been wary of making a commitment to Ingres at a time when it has made pacts with Ingres competitors. "DEC just recently made announcements about marketing agreements with Oracle and Sybase," said Rob Anderson, a software consultant at Stratcom, Inc. in San Francisco. "A lot of things probably got thrown into DEC's decision and the degree of dissatisfaction it would cause other companies was probably part of it."

Greendale indicated that the search for more cash for \$130 million Ingres would probably continue. "We're in a cash-burn business. Anytime you're growing at 30% or more, you burn cash," Greendale said. "So we're still looking."

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